THE READING PROCESS

SMITH

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THE READING PROCESS

BY

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PREFACE

This book is not primarily a treatise on methods of teaching reading. It concerns itself rather with the principles which underlie method. Its chief aim is to furnish a body of information—psychological, philological, historical, and experimental—which will enable the teacher to develop and use methods intelligently in place of accepting them blindly and following them slavishly.

More than the usual amount of attention is given to language—both spoken and written, but especially the latter. For this the author makes no apology. There is—as is commonly known—no dearth of instruction in the vernacular and in foreign languages in our secondary and higher institutions of learning. In spite of this, however, the majority of those who specialize in languages—either English or foreign—are poorly informed regarding the genetic and scientific aspects of the English language and of language in general. This is due to the fact that the students' activities are for the most part directed toward the mastery of literature and the acquisition of skill in expression—philological aspects being neglected. For the teacher whose work lies chiefly in the field of language—including the teacher of reading—this is unfortunate since it deprives him of the perspective so essential to initiative and resourcefulness. The chapters which deal with language and its accessories—for the most part chapters I to

IV—are, therefore, intended to supply the linguistic information most urgently needed by the teacher of reading.

Considerable historical material has been introduced. For this, too, no apology is needed since a critical analysis of current practices can usually be undertaken most advantageously in the light of their development.

The vast experimental literature which has been produced during the last few decades has been freely drawn upon. In fact, it constitutes the basis of the discussion from beginning to end. The treatment is, therefore, distinctly quantitative. Suffice it to say that no other mode of approach or method of treatment would be justifiable at this stage of educational practice.

The content of the book—as well as its arrangement—is essentially that of a course which the writer gave for several years to prospective teachers and supervisors of reading.

Special acknowledgments are due to my colleagues, Mrs. Alice O. Hunnewell and Miss Katherine L. McLaughlin, who have offered many valuable suggestions—the former in connection with the chapter on TEACHING BEGINNERS TO READ and the latter in connection with the chapter on CONTENT OF READERS.

Acknowledgments are due, also, to Dean W. S. Gray, Mr. E. D. Burbank, The American Antiquarian Society, The Bureau of American Ethnology, Henry Holt and Company, D. Appleton and Company, Harper and Brothers, Ginn and Company, The Macmillan Company, and the Simplified Spelling Board for permission to use valuable materials.

For permission to use illustrations, acknowledgments are due to The Bureau of American Ethnology for Plate I; to D. Appleton and Company for Figures 1, 7, 8, and 9; to The American Antiquarian Society for Figures 2, 3, 4, 5, and 6; and to Dean W. S. Gray of the University of Chicago for Charts I-VI inclusive.

Finally, the writer is greatly indebted to the many other sources—far too many to mention here—upon which he has so freely drawn throughout the discussion.

Los Angeles, California.
July, 1922.

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CHAPTER I

LANGUAGE

Reading an elaborate form of language behavior.—To the casual observer reading appears to be a simple and commonplace performance. A little reflection, however, will convince anyone that this is far from true; and the farther the analysis goes the more one becomes conscious of the astounding complexity of the process. The printed word, so familiar and so natural to the eye of the accomplished reader, is in reality a very intricate contrivance—a contrivance representing not only the unitary sound of the spoken word, but—through letters and groups of letters—its component sounds as well. The mechanism of the spoken word is even more elusive. In some mysterious way it has come to stand for our ideas and meanings, and to stand for them so inextricably that were we to be deprived of its use we should cease to think and to speak—at least until we could find a substitute for it. And reading without thinking and speaking would in the very nature of the case be quite out of the question.

To evolve this elaborate form of language activity was of course no easy task. Before man could enter upon this undertaking it was essential that he acquire some facility in thinking and in communicating with others. Before

he could think and communicate it was necessary that he adopt signs or symbols—usually the gesture and the spoken word—to represent his ideas and meanings. And finally, before he could read he was compelled to devise objective signs or symbols—usually graphic—to represent either his ideas or the sounds which had come to stand for them. It is little wonder, therefore, that it took the human race ages to arrive at its present level of accomplishment in reading; that civilizations rose and fell baffled by the subtlety of this art; and what is more, that the attainments of to-day represent probably—even in the case of the most advanced races—only very meager approximations to what might be and doubtless will be in time to come.

Genuine language behavior limited to the human race. —The capacity for genuine language behavior appears to be limited to the human race. In fact it seems to be the one endowment which differentiates man most completely from the animal. Contrary to popular opinion no animal has, as yet, given evidence of genuine language activity. To be sure some animals—the parrot for example—display a high degree of vocal capacity—so much so, indeed, that they are able to imitate the human voice in a striking manner. However, the words which they use so glibly are not associated with ideas and meanings as they are in the case of man. They have at best nothing more than a vague emotional background which may color them at times with such feelings as anger, pleasure, and exhilaration. They are thus in no sense true language symbols. Other animals—the dog, the ape, and the horse —whose vocal capacity is more limited—have at times

given evidence of what on the surface appeared to be associative capacity. In other words, they seemed to be able to answer questions in terms of symbols of one kind or another and to carry out reasonably complex commands. However, a critical examination of such cases has invariably led to negative conclusions—the unusual forms of behavior being in each case nothing more than complex responses to given stimuli.

The seeming language behavior of the famous horse—Clever Hans—furnishes an excellent example. Hans not only appeared to understand spoken language—as indicated by his responses—but he seemed to give evidence of remarkable ability in reading, in calculating, and in the use of symbols for purposes of communication. In fact so striking were his performances that they attracted the attention of the leading psychologists of the day, and only after repeated and careful investigation was it possible to offer a scientific explanation for his apparent language activities. They were found to be purely imitative—being called forth by unconscious movements on the part of the experimenter. "As soon as" the latter "had given a problem to the horse, he involuntarily bent his head and trunk slightly forward, and the horse would then put his right foot forward and begin to tap, without, however, returning to its original position. As soon as the desired number of taps were given, the questioner would make a slight upward jerk of his head. Thereupon the horse would immediately swing his foot in a wide circle bringing it back to the original position." [1]

[1] For an excellent summary and discussion of this and similar cases consult Watson, J. B.: *Behavior,* Chap. IX.

Communication of feeling attitudes through animal cries.—But it must not be inferred that the absence of genuine language capacity precludes all possibilities of communication between animals. The only conclusion which we are warranted in drawing is that they have not reached the level of mental development on which it is possible to label experiences with symbols so that they may be rearranged indirectly—thought over—and communicated to others independently of the situations giving rise to them. The animal must, therefore, deal with his experiences directly in terms of concrete situations while man has the capacity to deal with them indirectly in terms of free ideas. Although he lacks the capacity of free ideational communication, the animal succeeds—and often in a striking manner—in communicating his feeling attitudes to other animals. The most common media of such communication are the so-called animal cries. These cries are largely instinctive emotional expressions of such attitudes as hunger, fear, anger, surprise, and exhilaration. They differ from true language symbols in that they are direct and natural responses to experience—the latter being indirect and symbolic. They serve as media of intercommunication because they arouse in other animals—especially in the case of those related in structure and organization—similar emotional attitudes and responses. Although the communication of feeling attitudes through instinctive utterances is far removed from genuine language behavior, the two are not unrelated. Human language arises out of instinctive emotional expression, and it never becomes completely divorced from it. The exclamation plays an important part in

human speech and without an ever present emotional coloring our words would lose much of their charm.

Levels of language development.—Human language has in the course of its evolution passed through a variety of stages. In the first of these—essentially a pre-language stage—communication was on a purely emotional level. Attitudes rather than ideas were communicated from one individual to another. There was on this level no intrinsic difference between human and animal language. Such differences as existed were quantitative rather than qualitative. The range of human communication was, however, even at this stage much greater than that of the animal because early man was endowed with a far more complex vocal mechanism and with a much greater variety of reflexes and instincts than the highest animals.

During the second stage of its development language was on the gesture level. In order to reach this, man took a step which the animal could not take. In other words, he began to raise communication to ideational and purposive levels. Hitherto he had reacted to the various situations in which he found himself in a purely spontaneous emotional manner. Now he began to view such situations as objective and as subject to adjustment provided certain steps were taken. If he was suffering pain, for instance, he could communicate his condition to another to the end that he might obtain relief. He could do this through the use of the gesture or natural sign which in the very nature of the case closely resembled the situation in which he found himself and the end which he desired.

During the next stage man reached the final language

level. On this level the medium of communication—be it gesture or sound—no longer resembles the situation or the idea. It has become a symbol. The fact that sound rather than gesture symbols were selected is not without significance. A highly developed gesture language would have been quite possible. However, as has been repeatedly pointed out by leading authorities, sound was a far more desirable medium of communication than the gesture. Not only were the vocal reflexes so abundant and so highly developed in man that they placed at the service of language an almost unlimited number of highly differentiated sound symbols, but they represented marked advantages in other respects. They could be used without interfering with normal activities of various kinds. They could be used in the dark and at distances where physical gestures were quite useless. Finally, the human voice is peculiarly responsive to changing emotional states. It could express these as no other medium possibly could.

Language development in the child.—The development of language in the case of the child is in a sense much like the racial development of which we have just spoken. Long before the dawn of true language, the child develops a vocal behavior of considerable extent. His earliest sounds and cries are purely reflex and instinctive emotional reactions to a variety of situations such as hunger, anger, pleasure, and pain. As time goes on, many of these sounds become more or less dissociated from the original situations, but the child—largely for the sake of the pleasure which such vocal play affords him—continues to use these expressions in the most varied com-

binations. Gradually, too, he comes to add further to his stock in trade by imitating those about him. All this time he is of course—contrary to popular opinion—on the lowest language level, for his utterances are anything but true language symbols.

Presently, however, his behavior begins to change. It becomes more objective. He points toward and reaches for fairly definite things. For this purpose he uses his voice often quite as freely as his arms. He has entered upon the gesture stage, and in spite of the fact that his media of communication are rather clumsy, he succeeds in a remarkable manner in making himself understood. All this time his stock of words continues of course to increase, and, more important still, he comes to learn that they serve him far more effectively than cries, gestures, and other forms of direct behavior. Hence, words come to take the place of these increasingly, and in consequence the child finds himself on the highest language level. His words—although still comparatively few—have become true language symbols. Before him lie, however, almost unlimited possibilities. All his life he is to add to his ever increasing stock of symbols. The meanings, too, —for which the symbols stand—are destined to undergo change upon change. He has, indeed, entered upon a conquest the significance and the vastness of which are not readily appreciated.

A word of caution is in order at this point. We have spoken rather freely of racial and individual levels of language development. Such classifications are at best a means rather than an end. They are always more or less artificial and arbitrary. It must not be inferred, there-

fore, that the boundaries between these stages are clearly defined or that the stages themselves are mutually exclusive. Language development was continuous and progressive—each level often representing all that had gone before. Emotional expression couched in more or less conventional forms, as well as gestures of a great variety, play an important part in human language. Has it ever occurred to the reader how shallow and lifeless human speech would be if it were not for the glow which comes from a rich emotional coloring and for the emphases and picturesqueness which are introduced by the ever varying vocal, facial, and bodily gestures of the speaker? And what is this emotional coloring but a more or less spontaneous feeling reaction to the meaning and significance associated with the symbols of our speech? And the gestures, are they not obvious attempts to reënforce the communication of ideas in a direct manner?

The nature of meaning.—It now becomes our task to inquire more closely into the nature of the meanings which are associated with the symbols of genuine language behavior. The crucial difference between the words of a human being and those of the parrot lies—as has been repeatedly stressed—in the fact that the former are associated with meanings and ideas while the latter are not. Accordingly, man is able to use his words as instruments of thought and communication while the parrot can do little more than play with them. In considering the nature of meaning, two problems present themselves to us: We must inquire how words acquire meanings, and we must examine the processes which enter into the recognition and interpretation of words and sentences.

How words acquire meanings.—In endeavoring to answer the question raised by the first problem—how words acquire meanings—we cannot do better than quote several prominent authorities. Watson—writing from the standpoint of behavioristic psychology—takes the position that vocal habits (words) cannot become language habits (symbols) until they have become associated with bodily habits (reactions to situations), or until they have become substitutes for these. In other words, he holds that the symbols of a language derive their meaning and their significance from the fact that they have in some manner become associated with our experiences with things and our reactions to real situations. By the time the child is prepared to form genuine language habits, it has acquired much experience with things and many bodily habits. "The use of the hands, arms, fingers, and organs of locomotion has been more or less perfected"—"hundreds of habits of response to objects" having been formed. It "has learned to respond by appropriate acts to its doll, bottle, small boxes, and to hundreds of other objects." "These habits of response to objects," Watson holds, "are essential to the formation of language habits." He aptly illustrates the way in which these reactions become associated with the vocal habits (words) of the child:

> The stimulus (object) to which the child often responds, a box, for example, by movements such as opening and closing and putting objects into it, may serve to illustrate our argument. The nurse, observing that the child reacts with his hands, feet, etc., to the box, begins to say "box" when the child is handed the box, "open box" when the child opens it, "close box" when he closes it, and "put doll in box" when that act is executed. This is repeated over and over again. In the process

of time it comes about that without any other stimulus than that of the box which originally called out only the bodily habits, he begins to say "box" when he sees it, "open box" when he opens it, etc. The visible box now becomes a stimulus capable of releasing either the bodily habits or the word habit; that is, development has brought about two things: (1) a series of functional connections among arcs which run from visual receptor to muscles of throat, and (2) a series of already earlier connected arcs which run from the same receptor to the bodily muscles. When the box is presented now, which set of arcs will function? Evidently either (1) or (2) or both simultaneously. It is at this time that the influence of the environment upon shaping language habits comes again clearly to the front. The object meets the child's vision. He runs to it and tries to reach it and says "box." The box happens to have been put beyond his reach. The nurse, seeing the child's efforts to reach it and hearing the word "box," hands it to the child. This situation being repeated day in and day out, not only with this object but with hundreds of others, brings it about that the arcs running from receptors to throat muscles offer the least resistance so far as concerns the neural impulses aroused by the box. Finally, the word is uttered without the movement of going to the box being executed. There has been a substitution (mechanical process) of a language habit for a bodily habit. One other step and the process is complete. We found in our studies on the maze that every *cul-de-sac* represented what we might call a simple unit habit. These simple habits when perfected rise serially. When learning is complete, we can put the animal down anywhere in the maze, and after a few trial movements the remaining part of the journey is executed without a break. Something similar of course occurs in all complete systems of bodily habit and in language habits as well. Habits are formed of going to the box when the arms are full of toys. The child has been taught to deposit them there. When his arms are laden with toys and no box is there, the word habit arises and he calls "box"; it is handed to him and he opens it and deposits the toys therein. This roughly marks what we would call the genesis of true language habit.[1]

[1] Watson, J. B.: *Behavior,* pp. 329-330.

Judd—who writes from the standpoint of functional psychology—takes a very similar position. He holds that words gain their significance or meaning through "direct association with bodily reactions"—reactions or responses called forth by the varied stimuli of the environment of the individual. The reactions thus associated with words are, however, in his estimation, not infrequently greatly reduced forms of the original. He gives the following illustration of the manner in which these associations take place:

> When I seize an object I get at first an impression of that thing; if the impression is disagreeable, I react by pushing it away. The end of the whole process is the pushing away. Later as I become acquainted with the thing, I push it away without examining it in detail; that is, without a complete impression of it. Finally the merest suggestion that the thing is there will arouse the reaction. The reaction can now be detached from the thing and can be attached to some substitute for the thing. Thus the word *danger* sounded in my ear causes me to jump. The word *danger* is a substitute for an impression or an idea of a dangerous thing. The words *rough* and *smooth* arouse in me contrasting experiences without any necessity of first handling some rough or smooth thing. The words have in all these cases taken meanings to themselves; that is, they have taken on connection with interpreting forms of behavior.
>
> It is not alone in the sphere of emotional interpretation that words become independent of the experiences from which they first derived their meaning. Take for purposes of illustration such words as *up* and *down*. These words were at first interpreted to us in childhood by someone who pointed upward or looked upward when he used the word *up*. Sometimes the word was associated with the observation of a flight of stairs or a ladder. Ultimately all these experiences were condensed into a few faint tendencies to roll the eyes upward or downward, and the adult thus appreciates in an easy way, through a mere tendency to move, the meaning which the child had to learn

through many experiences and much effort. Furthermore, the rolling upward of the eyes has, in the course of mental development, attached itself not only to tall things and high things but also to such matters as abstract values, as when we say that prices have gone up. Again, we say that a man's career is downward. Words thus come to have a value of their own without going back to things for their interpretation.[1]

These illustrations of the manner in which words come to assume significance make it clear that word meanings are intimately connected with our behavior. Indeed, they grow directly out of it. A word is obviously a meaningless sound until it comes to stand for or to represent some habitual reaction or response to our environment. Once words have acquired this representative power, however, they become instruments of inestimable value. They enable us to consider our experiences in an indirect and economical manner whenever and wherever we desire. Accordingly, we come to live in a world of words to a marked extent. We conceive our experiences and our behavior in terms of words. We analyze, rearrange, and elaborate them in terms of words. And, what is more, we anticipate through words the behavior and the experiences which are to come—in short, we think before we act and we plan before we execute.

The fact that word meanings grow out of the experiences of the individual—through association with his reactions and responses—is of tremendous significance for those intrusted with the education of children—and adults, too, for that matter. We have long been too much concerned with the teaching of words. The all important experience background has been too largely

[1] Judd, Chas. H.: *Psychology of High School Subjects,* pp. 154–155.

ignored or neglected. In consequence there has been—and still is—altogether too much parrotlike repetition in our educational institutions. In some cases this unfortunate condition may be readily corrected by providing for proper associations since the learner already possesses the requisite experiences. In other cases the experiences may be easily supplied. There are, however, many cases—especially in our elementary and high schools—in which the experiences cannot possibly be supplied because of the immaturity of the pupils. In other words, we are in such cases dealing with a content which is beyond the actual and—for the time being—beyond the possible experience background of the pupils. For illustrations we need not go beyond the content of some of our school readers and the classics studied in the English classes of many of our high schools.

Processes entering into the recognition and interpretation of words and sentences.—We have discussed at some length the manner in which words acquire meanings. As we progressed, it became increasingly evident that meanings arise out of our experiences—that they consist essentially of our habitual reactions and responses to real situations. We shall now consider the problem of the nature of meaning from a slightly different angle. The question before us is: What do we experience when we get the meanings of words and sentences?

It has been too often naïvely assumed that we experience on such occasions chiefly mental images—a sort of pictorial representation of the things and events read or talked about. The reader may have little difficulty in recalling how persistently some of his teachers stressed

the necessity of imaging clearly whatever was being read. He may also recall discovering presently that he could read with greater speed and satisfaction when forgetting all about images and pictures. And his discovery was quite in keeping with the facts in the case. Any serious attempt to image the meanings of the words which are being read or spoken is not only an extremely slow and cumbersome process, but it is often quite impossible—particularly in the case of the more abstract words. For many of these words there could be—in the very nature of the case—little, if any, imagery in the sense in which structural and functional psychologists use the term. A critical examination of what actually happens when we recognize and interpret words and sentences shows that the phenomena—usually designated as mental imagery—are a later incident rather than the essence of meaning. Only when the meaning is allowed to unfold itself beyond the normal stage are these likely to appear to any extent. A rapid and efficient reader experiences little, if any, imagery as he goes along.

Experimental investigations show that word presentation is likely to be followed by a recognition of the word form as familiar and by a feeling of confidence on the part of the individual that he knows what the word means and that he could use it if necessary. If the presentation is visual, it is almost invariably followed by some degree of mental pronunciation. The extent of this inner pronunciation varies of course greatly with individuals. On the one extreme it is so prominent that it results in very obvious lip movement and on the other it is so much reduced as to be barely vestigial. It is safe to

say, however, that this inner pronunciation plays an important part in the case of most readers. The reader may readily convince himself of its importance by trying to exclude it—through the repetition of a nonsense syllable—while reading several sentences or paragraphs. Such reading is extremely difficult for the average individual.

Experimental investigations show, further, that word recognition is usually accompanied or followed by strong tendencies toward structural associations. Huey, who experimented with a considerable number of subjects, found that the mental pronunciation of the word was apt to be followed by "a mental pronunciation of some phrase or other word that had been associatively connected, as when *by* gave *sweet by and by, vertical* gave *vertical writing,* etc." Quite frequently "there would be but a dim suggestion of some familiar line of poetry, leaving the reader with a vague and tantalizing feeling of something which he could not get." Connective and relational "words gave evidence of setting the reader's thoughts in some characteristic direction of expectancy, and doubtless the prepositions, especially, always had some very general influence in determining how the whole psycho-physical organism should face a coming related object." When words and phrases were exposed consecutively in context, "the readers took a more active attitude, the associations were less varied but more numerous, and there were other very characteristic differences."

A reader who had looked blankly at the word *A* when exposed singly, and had gotten no associations, had a rich content of associations when *A* appeared as the first word of a new paragraph.

Besides, his feelings of expectancy, curiosity, strain, the *forward push* that was marked in all readers of the context exposures, were even more prominent than the definite associations. The mere statement that the word to be exposed is part of a sense passage limits the trend of the association at the start. The limitation extends farther when the reader has caught the general topic discussed in the passage, and still farther when the exposed word is presented upon a verbal and ideational background formed by the complete preceding context. In the spider story, for example, after the mention of *web-weaving,* the word *top* no longer suggested *top of hill, flagstaff, spinning tops,* etc., as when it was exposed in isolation, but now suggested the top of a post or gateway, with the spider situation in mind.

The newly exposed word was usually mentally pronounced as before, and was *fitted into the preceding,* as one reader very often put it, the new word seeming to contribute toward a notion of sentence unity to which each additional element added a needed part. Immediately following this there was usually a filling out of the sentence or phrase so as to make sense with what came before, and when this did not actually occur, there was usually the *forward push, forward tendency, tendency to fill out,* as it has been variously described by the readers. All emphasized the strength and comparative constancy of this feeling, and mentioned it as perhaps the most striking thing observed in the experiments.[1]

The processes thus far enumerated—the recognition of word form as familiar, the feeling of confidence on the part of the individual that he knows what the word means and that he could use it if necessary, the inner pronunciation, and the tendency on the part of the word to enter into structural relationships with other words—doubtless play an important part in word recognition and interpretation. But there are other and more fundamental processes. Our discussion of the manner in which words acquire meanings brought us face to face with the

[1] Huey, E. B.: *Psychology and Pedagogy of Reading,* pp. 153–156.

fact that meanings come only as words become associated with or take the place of certain forms of our behavior. It is to be expected, therefore, that word recognition and interpretation should involve tendencies to recall and—if sufficient time be allowed—to reinstate these forms of our behavior. In other words, there is a tendency to react in the presence of the word as we would react in the presence of the real situation. It is here—in these tendencies to react in an appropriate manner—that we find the fundamental processes entering into the recognition and interpretation of words. Judd says:

> When I utter the word *dog* or hear the sound which comes from uttering that word, the partial or verbal reaction expands instantly into the general bodily attitude appropriate to the experience of seeing a dog. If I am afraid of dogs, the essential part of the experience will be a feeling of violent contraction of my internal muscles and a desire to run. If I am fond of dogs, I shall have a reaching out of all my muscles and a feeling of satisfaction.[1]

Under ordinary conditions these reactions do not, of course, assume the proportions indicated above. If they did, word interpretation would be a rather strenuous and dramatic process. As a matter of fact, the mere tendency to react in an appropriate manner usually suffices for word interpretation. A certain amount of feeling reaction is doubtless always present. In some cases this may be so pronounced as to overshadow all other concomitants; in other cases motor and logical tendencies predominate. Much depends of course upon

[1] Judd, Chas. H.: *Psychology of High School Subjects*, p. 147.

conditions—both objective and subjective. A traveler in a snake-infested region would doubtless react more freely to the word *rattlesnake* than a person far removed from the danger zone. Similarly, the word *fire* would elicit a very different response in a crowded theatre than in an open street. The influence of subjective states upon reactions and reaction time is well known. Other things being equal, individuals who have at some time or other had unpleasant experiences with *rattlesnakes* and with *fire* will react with greater feeling to these terms than others. The fact remains, however, that for most of our ordinary word interpretations—spoken or written—the reactions are little more than tendencies to action. And not infrequently these are so highly generalized as to appear trivial and unrelated to the situation in question.

It remains to be pointed out finally that the unit of meaning is usually larger than the word. It is the more comprehensive thought group—most often the sentence. We are rarely concerned with words alone in our speech. When we are, the words represent in reality sentences or larger thought units. Word meanings are of course genuinely real; only in themselves they are bundles of possibilities rather than complete thought units. They often vary in a striking manner in the midst of an ever changing context. The value of words, as Judd has well put it, "lies in the fact that they carry experience forward, furnishing only so much content as is necessary to support thought."

Huey's findings point in the same direction. He concludes:

Of specific meanings beyond this general feeling of *making sense,* everything in my own experiments indicates that they are usually total meanings belonging to sentences or to unitary parts of sentences, but felt differently as this or that particular word is being dealt with; or we can say that the particular word's meaning is felt in a perspective of the total meaning. A relation can hardly be felt apart from the terms or objects related, a particular manner or intensity of action or being can hardly be suggested by an adverb apart from the thought of the action or being itself. And likewise a substantive that is thought of naturally has, in this thought, something of the substantive's relationships. In short, it is total situations and performances that we think of and read of, and these are often complex, always with various aspects and various relationships of parts. No single word names or describes the whole. When a single word is presented, therefore, it suggests but a part or an aspect of this total meaning and is felt as inadequate and artificial unless given in its sentence context. With meanings, as with vocal utterance, the sentence meaning is the natural unit, and smaller divisions considered apart from this are felt as *disjecta membra.*[1]

Social origin and function of language.—While language activity is at base instinctive, its development is dependent upon social stimulation. An individual growing up entirely apart from other human beings would develop little beyond certain crude forms of emotional expression. Several individuals growing up together would of course—as did the race—develop effective modes of intercommunication, but the contribution of any one generation would be trifling since language systems are the product of time. Once language is developed, it becomes conventional and is acquired through imitation. Under these circumstances instinctive tendencies toward expression, a social environment furnishing stimu-

[1] Huey, E. B.: *Psychology and Pedagogy of Reading,* pp. 166–167.

lation, and the capacity to imitate constitute the essential conditions for language development. The nature and the extent of the actual development depend upon the conventions—the language—of the social group in question. Whether an individual is to acquire the simple language of a primitive tribe or the highly developed language of a civilized people, or whether he is to learn to speak English, French or Spanish, or whether he is to acquire a conventional language at all is entirely determined by his environment.

Once language was developed it became an instrument of tremendous significance for the race. In fact without it, social evolution—as we know it—would have been quite out of the question. Language is the one bond which has held men together from the earliest times—enabling them to effect tribal and national organizations, to develop common traditions and ideals, and to attain remarkable unity and homogeneity in spite of vastly divergent tendencies and interests. With the advent of writing, the power and influence of language were greatly enhanced. Spoken language has severe limitations. As an instrument of communication it is too transient and too severely restricted by space and time. Large bodies of people and people widely separated can be reached far more effectively through written language. Indeed, a truly progressive civilization would have been quite impossible without some form of graphic language. Only through this medium is it possible to accumulate knowledge and to transmit it effectively from one generation to another. The invention of writing—and printing more recently—more than any other factor has made it pos-

sible for each successive generation to begin where the preceding left off.

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CHAPTER II

THE EVOLUTION OF WRITTEN LANGUAGE—PICTURE WRITING AND TRANSITION STAGES

In the last chapter we discussed at some length the origin and nature of language. As we progressed, it became increasingly evident that the two outstanding language factors are symbols and meanings. To the latter we devoted considerable attention; the former it now becomes our task to scrutinize more closely. Since we are concerned with language primarily from the standpoint of reading, our interest will of necessity center about the graphic rather than the spoken symbol. With all this, it must not be forgotten that the relationship between the two is a very intimate one—especially during the later stages of language development.

Stages in the evolution of graphic language symbols.—The story of the evolution of written language is a long and intricate one. The graphic representation of language—in all its marvelous complexity and variety—was not evolved overnight. It does not commemorate the inventive genius of any one individual, nor does it mark the peculiar contribution of a particular people or a given epoch. It is rather the outcome of a long process of evolution—a process beginning in the dim past and continuing to the very present—contributions having been made all along the line by a great variety of peoples and

agencies. That the contributions thus made should in many cases have entered upon a struggle for existence and that much should have been eliminated as time went on, is in accordance with expectation. In a sense, therefore, the graphic symbols of to-day are the survivals which for one reason or another have stood the test of time. That only the best forms—from the standpoint of linguistic perfection and efficiency—have survived, we shall not contend. Yet we must admit that the trend of the development on the whole has been in the right direction. This is all the more striking since the process has of necessity been largely an unconscious one. Conscious evolution in language—as in all other human institutions—comes at a comparatively late stage. It is, therefore, only in relatively recent times that man has begun to turn the searchlight upon his own linguistic behavior and to propose its scientific direction. Indeed,—as will appear from subsequent discussions—we have scarcely reached that point yet. Language occupies an intimate and preponderant place in human behavior and so is not subjected readily to thoroughgoing changes—such as the adoption of a phonetic or even a partially simplified system of spelling. That such steps are not only desirable but ultimately probably quite inevitable, we shall point out later. Meanwhile, it will be our chief concern to trace briefly the evolution of graphic language from its simplest beginnings to its present varied and complex status. In so doing, we shall find it convenient to center our discussion about the following natural developmental stages:

I. *The picture writing stage,* in which the signs represent directly objects and ideas or objective and idea-

tional situations. In connection with this the following substages may be distinguished:

1. *The mnemonic,* in which the sign is primarily a reminder;

2. *The pictographic,* in which the sign represents directly an object or an objective situation;

3. *The ideographic,* in which the sign represents directly an idea or an ideational situation.

II. *A transition stage,* in which the sign refers not only to the object or idea which it represents but to its name as well.

III. *The phonetic stage,* in which the sign refers to sounds or spoken symbols irrespective of their meanings. This resolves itself into the following substages:

1. *The verbal,* in which the sign represents a whole word;

2. *The syllabic,* in which the sign represents a syllable;

3. *The alphabetic,* in which the sign represents an elementary sound.

We shall discuss the first two of these—the picture writing and transition stages—in this chapter; the third—the phonetic stage—together with some account of the evolution of the printed page, we shall elaborate in the next.

I. *The picture writing stage.*—In this stage—as indicated above—the signs refer directly to objects and ideas or to more complex objective and ideational situations. The names of the things referred to do not enter into the situation directly. This does not mean of course that names as such are absent. Thinking, as pointed out elsewhere, always goes on in terms of symbols of some

kind—usually in terms of words, though gestures appear to play an important part in the case of primitive man. Accordingly, in spite of the fact that signs suggest at this stage objects and ideas rather than names, the thought processes which they arouse in the reader must go on in terms of symbols—the spoken word and the gesture. The situation, then, is something like this: The sign, be it picture or graph, portrays or suggests to the reader objective or ideational situations varying in complexity—a particular animal such as a buffalo, a concrete experience connected with the hunt or chase, an abstract idea such as virtue, or complex situations involving both the concrete and the abstract; the reader reacts to these much as we do to a cartoon, a pictorial, or an illustration; that is, he thinks (talks) the situation over in terms of language symbols of his own choosing—always within the limits of the situation of course—rather than in terms of words directly suggested by the signs as in the case of modern reading.

This leads to the important observation that spoken and written language, although divorced during the early stages, are, nevertheless, intimately related—both being objective expressions of a common thought background. This will become increasingly obvious as we trace picture writing through its several levels of development.

1. *The mnemonic.*—There is ample evidence that man began his career as a writer and reader by devising mnemonics—objective or graphic signs serving as memory aids or reminders. In all parts of the globe and among widely varying peoples there are found indications of such. Indeed, in some instances relatively primi-

tive forms of reminders have persisted among our own race to this very day. That writing and reading should have begun thus is not surprising when one considers their function in the highly complex life of to-day. Even now—aside from communication at a distance—we are

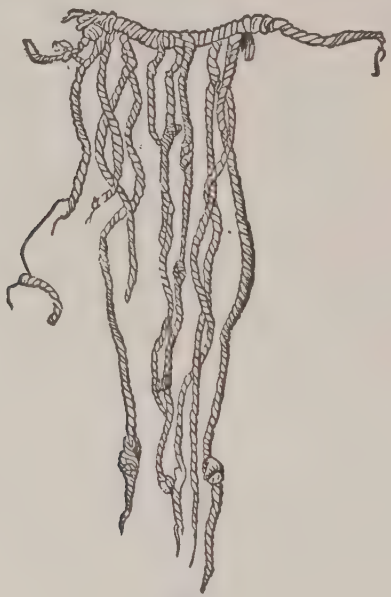

Fig. 1.

chiefly interested in recording thought in order that it may be made permanently accessible to ourselves and to others. Mnemonics naturally varied widely—all the way from crude drawings to elaborate objective forms such as the quipu, the notched stick, and the wampum belt, which are commonly cited as the best examples.

The quipu (Fig. 1) was without question the most

interesting and the most elaborate of these mnemonic devices. It was in common use among many peoples, including the Peruvians, the North American Indians, the Hawaiians, the Chinese, and the Egyptians. Clodd gives the following interesting description of the Peruvian quipu:

> It consists of a main cord, to which are fastened at given distances thinner cords of different colors, each cord being knotted in divers ways for special purposes, and each color having its own significance. Red strands stood for soldiers, yellow for gold, white for silver, green for corn, and so forth, while a single knot meant ten, two single knots meant twenty, double knots one hundred, and two double knots two hundred. Such simple devices served manifold purposes. Besides their convenience in reckoning, they were used for keeping the annals for the empire of the Incas; for transmitting orders to outlying provinces; for registering details of the army; and even for preserving records of the dead with whom the quipu was buried, as in old Egypt the biography or titles of the deceased were set forth in hieroglyph and deposited in the tomb.[1]

The notched stick also had a wide geographical distribution and appears to have served much the same purposes. It was made of wood, and the facts to be recorded were inscribed upon its surface in the form of notches. As late as "a half century ago," Hoffman states, "it was customary in Scotland for the baker's lad to bring the nick-sticks with his bread, a notch being made for each loaf he left. While the notches on his stick corresponded with those on the one left with the family, both parties were satisfied that the account was correctly kept." [2] The wampum belt was prevalent among the North Amer-

[1] Clodd, Edmond: *The Story of the Alphabet,* p. 37.
[2] Hoffman, W. J.: *Beginnings of Writing,* p. 141.

ican Indians—especially the Iroquois. It was made of "beads or perforated shells arranged in various more or less conventionalized patterns on bark filaments, hemp, or deerskin strips or sinews." The patterns were "pictorial symbols recording events in the history of the tribe or treaties between tribes." They were also "used to denote land boundaries or personal property." [1]

2. *The pictograph.*—But the growing needs of primitive man were too complex and too urgent to permit him to tarry long on the mnemonic level. We are, therefore, not surprised to find that he began to record his thoughts and his achievements in rude pictures long before the possibilities of the simple mnemonic devices had been fully exhausted. As time went on, these pictures assumed an elaborateness little dreamed of. They were inscribed upon almost every conceivable substance from the human body to the façades of massive rocks and cliffs—the most common being the natural and artificial objects of everyday environment such as pebbles, stones, bones, skins, wood, copper, dwellings, monuments, pottery, textiles, tools, and fetishes. These pictures dealt with every phase of life—and the life of early man was not so devoid of content as civilized man is sometimes disposed to infer. He had his political and social organizations, his economic struggles, his problems of war and peace, his religious practices, his customs, his traditions, and his achievements. In all of these he was tremendously interested, and consequently the pictograph is concerned with all of them.

In its pure form the pictograph depicts and portrays

[1] Clodd, Edmond: *The Story of the Alphabet,* p. 42.

objects and objective situations as they are, although of necessity in an abbreviated and schematic manner—a buffalo being portrayed by a picture representing the characteristic features of that animal, and a hunting expedition by a series of pictures depicting the essentials of such a situation. Such direct pictorial representation is a comparatively simple matter as long as it concerns concrete objects and very elementary situations of everyday environment, but the moment that the picture writer comes face to face with abstract ideas and with the necessity of representing reasonably complex situations he gets into serious difficulty for these cannot be depicted so directly. A variety of devices—more or less obscure and indirect—at once becomes a necessity. Beyond the representation of simple objects it is, therefore, not so easy to find pure pictographs. Most pictographic representations involve much that is ideographic as well.

Mallery—who made an intensive study of the picture writing of the American Indian—distinguishes the following classes of pictographs: [1] (1) *chronological,* including pictures purposing to deal with ordinary time units—days, weeks, months, years, epochs—each unit being pictorially represented by its most striking event and the pictures for the several time units being arranged in consecutive order, usually on skins; (2) *notices,* concerning visits, departures, directions taken in going from place to place, conditions such as starvation or disease, and impending danger; (3) *communications,* such as declarations of war, professions of peace and friendship, chal-

[1] Mallery, G.: *Picture Writing of the American Indian.* Tenth Annual Report of the Bureau of Ethnology.

lenges, social and religious missives, and claims or demands; (4) *totems, titles, and names,* especially pictorial tribal and class designations, tattoo, insignia or tokens of authority, signs of individual achievement, property marks, and personal names; (5) *religious,* embracing symbols of the supernatural, myths, mystic animals, shamanism, charms, ceremonies, mortuary practices, death notices, and grave posts; (6) *customs,* relating to cult societies, daily life and habits, and games; (7) *historical,* referring to expeditions, battles, migrations, and sociological events; and (8) *biographical,* representing continuous records of events in life, as well as particular events or exploits.

An excellent example of the use of the pictograph to depict a continuous series of events representing the customs and practices of a people is given by Mallery—the illustration being a five page extract from a post-Columbian manuscript in the Mendoza collection, now in the Bodleian Library, published by Kingsborough. The first page "exhibits the customs of the Mexican at the birth of a male or female infant; the right and ceremony of naming the children and of afterwards dedicating them and offering them at their temples or to the military profession." The second page illustrates the bringing up of boys and girls from the ages of three to six. The third (Plate I) represents the training of children from seven to ten. The fourth shows the education of boys and girls from eleven to fourteen, and the fifth the adoption of an occupation and the laws and usages followed in marriage.

3. *The ideograph.*—As indicated repeatedly, the pictograph and the ideograph almost invariably go together

PLATE I.

wherever picture writing is found—the former prevailing during the earlier and the latter during the later stages. The moment that primitive man goes beyond the mere portrayal of objects—the moment that he attempts to depict situations—he encounters the more or less abstract which cannot be readily pictured in a direct manner. Accordingly, if the growth of his invention is not to be arrested, he must devise indirect means of representation; that is, where he cannot depict and portray, he must suggest and imply. The moment he does this, he resorts to ideography—however simple this may be in its beginnings. For this reason few of the illustrations commonly cited as pictographs are pictographs pure and simple. Most of them represent much that is ideographic as well. There are signs of direction, of time, of condition, of action, of emotions, of attitudes, of relationships, and of a host of other more or less abstract situations and concepts. All of these primitive man managed to express rather well—although not infrequently quite awkwardly —even during the early stages represented by the North American Indian.

These Indian tribes, in contrast with certain other primitive peoples who had advanced farther in ideography, showed, as Mallery points out, a marked tendency to use tangible and visible forms for the expression of the essentially abstract. In part this is to be accounted for by the fact that they had developed great facility in communicating by means of gesture or sign language; indeed, so well does communication by means of gesture or sign language appear to have been developed that the aboriginal North American had practically a universal lan-

guage. It is only natural that such gestures should be represented pictorially—often, to be sure, by force of necessity in seriously abbreviated and circumscribed forms. Aside from the gesture, the Indian employed a variety of devices to suggest the more or less abstract. Thus *old age* was suggested through wrinkles and projecting lips; *youth* by diminutive size; *largeness* through unusual size; the idea of *bad* through an abnormality; *disease* by common characteristics of the disease; *swiftness* by a figure representing rapidity of motion; *slowness* by a figure moving slowly; *peace and friendship* by clasped hands; *war* by two arrows shot in opposite directions; *abundance* by meat stored in a pit; *starvation* by a figure with bare ribs; *many* by repetitions; *much* by a heap; *possession* by objects held in front; *seeing* by a figure with a line extending from the eyes; *speech* by a line or commalike form in front of the mouth; *hearing* by lines extending from the ears; *sickness in general* by a figure leaning against a post; *the mystic* or *sacred* by a figure with waving lines above the head; *kinship* through a figure joined by a base line; *life* and *death* by a white circle and a black disk respectively; *morning, noon,* and *evening* by an upward curve with short lines attached at right angles to indicate the position of the sun; and so *ad infinitum.*

Conventionalization and symbolization on the ideographic level.—The development of picture writing wherever found is marked by two characteristic tendencies—tendencies toward conventionalization and symbolization. In accordance with the former, objects and ideas—at first represented and depicted now in one way

and now in another—come gradually to be regularly represented by the same simplified and stereotyped forms. Among the Northern Indian tribes of North America this tendency was clearly in evidence though by no means fully developed. Among the Mexican and Peruvian Indians its development was marked—common objects and ideas being represented without exception by the same stereotyped signs. Conventionalization, in so far as it involves the simplification of the figure or sign, is really a step in the direction of symbolization since the direct relationship between the sign and the thing signified is lessened. Symbolization is usually accomplished by the employment of such devices as the substitution of a part of the object or idea for the whole, and by representing one object or idea by another.

By means of the former—the substitution of a part for the whole—*animals* may be represented by footprints, parts of the body, or other special characteristics. Thus the *jaguar* is often indicated by its spotted skin; the *wild turkey* by the imprint of its foot; the *deer, elk, moose,* and *buffalo* by hoofprints of various sizes or by the head or horns; a *bear* by the figure of its paws; and a *horse* by its hoof. In the same manner *locomotion* came to be indicated by the outline of the sole of the foot, or the lower part of the legs in the attitude of walking; *running* by legs in the act of running; *negation* by the simplified form of the outstretched arms; *friendship* by clasped hands; *sorrow* by tears falling from the eyes; *traveling on foot* and *by water* by footprints and paddles; the *lassoing of horses* by hoofprints and a slight indication of a lariat; *night* by a circle with a star in the

middle; *eating* by a piece of maize cake protruding from the mouth; *drinking* by the symbol for water between the lips.

By means of the latter—the representation of one object or idea by another—a *tomahawk* came to signify war; a *pipe,* peace; a *crescent,* a month; *two arrows shot in opposite directions,* a battle; the *direction of the arrow's point,* the direction taken by the enemy; *trees with faint signs of buds,* spring; a *bee,* industry; a *roll of papyrus,* knowledge; an *ostrich feather,* justice; a *palm branch,* probably because of the annual cutting of the lower leaves, a year; a *jackal,* because of its watchfulness, a priest; a *vulture,* because it was supposed to nourish its young with its own blood, a mother.

II. *The transition stage.*—The transition from picture writing to phonetic writing represents, as all previous linguistic advances, a long period of growth and development. The later stages of picture writing are not wanting in indications of impending changes. There is in evidence, for instance, a tendency to add slight determinatives to pictures and signs in order that they may be used to designate a greater variety of objects or ideas—a practice which would in the very nature of the case tend to lessen the immediate bond between the sign and the thing signified. In the case of such languages as the Egyptian, the Chinese, the Mayan, and the Mexican, these determinatives were commonplace, but they were in evidence also among the less developed languages of the Northern Indian tribes—particularly the Ojibwas. Especially, as Hoffman indicates, did they use such marks or determinatives to indicate that a sign referred to the

mystic or supernatural. For instance, "when animal forms" were "intended to denote totems or clans, the simple outline of the animal" was "portrayed, but when a manido or spirit form of such animal" was "intended, a line or bar" was "drawn across the thorax, or short lines might be attached to the back extending from the head down to the extremity of the tail" or both. This tendency was "sufficiently persistent and conspicuous to indicate that the Ojibwas were on the verge of a transition from pure ideography to a modified form of ikonomatic (phonetic-picture) writing." [1] Furthermore, conventionalization and symbolization resulted, on the one hand, in a reduction and even an obliteration of the resemblance between the signs and the things signified and, on the other, in the adoption of stereotyped forms—the same object or idea being again and again represented by the same simplified sign or symbol. It is only natural that such a process should in time lead to a closer relationship between spoken and written language. And this is exactly what happened. The sign came presently to suggest the name as well as the object or idea. Tozzer gives some very interesting illustrations from the Nahua manuscripts—especially of place names. In every instance the syllables of the names thus given are "expressed directly by pictures of objects or acts, by position, or by color" and in each case the meaning of the picture and the sound or name are conveyed together: [2]

[1] Hoffman, J. W.: *Beginnings of Writing,* pp. 76–77.

[2] Tozzer, A. M.: *Value of Ancient Mexican Manuscripts in the Study of the General Development of Writing;* Proceedings of the American Antiquarian Society, 1911, pp. 89–93.

Cal-tepec (Fig. 2), the house on the mountain:
Cal from *calli,* house;
Tepec from *tepetl,* mountain.
A-tepec (Fig. 3), the water on the mountain:
A from *atl,* water;
Tepec from *tepetl,* mountain.

FIG. 2.

FIG. 3.

FIG. 4.

Coa-tepec (Fig. 4), the mountain of the serpent:
Coa from *coatl,* serpent;
Tepec from *tepetl,* mountain.

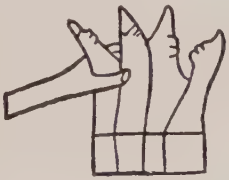

FIG 5.

Toli-man (Fig. 5), the place where the rushes are cut:
Toli from *tollin,* rushes;
Ma, the root of the verb meaning "to take something by the hand."

However, as repeatedly indicated in our discussion, many things cannot be thus directly and objectively represented. In consequence man is forced to resort to various indirect devices. At this stage of writing he

resorted to what is commonly called *rebus* representation. This constitutes the distinguishing mark of the transition stage. Rebus writing makes use of the fact that there are in most spoken languages numerous homophones—words similar in sound but different in meaning. Accordingly, when there is no picture to represent a word directly, the picture of another word—of the same sound but of different meaning—is used to represent the sound of the former. Thus, as Tozzer points out, the town *Tollan,* "the place of the rushes," is easily represented by a picture of a cluster of reeds, *tollin.*

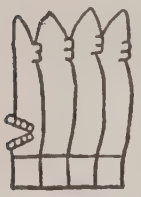

Fig. 6.

Suppose, however, a town named *Toltitlan* meaning "near Tollan" was the one to be written. This would be more difficult to express. The Nahua overcame this difficulty by making use of the fact that the second syllable *tlan* of the word *tetlan* meaning "near something" is also found in the word *tlantli* meaning "teeth." Accordingly, they were able to represent the name of the town *Toltitlan* meaning "near Tollan" or "near the place of the rushes" by adding the picture of teeth to the picture of a cluster of reeds (Fig. 6)—the picture of the teeth in this case losing its original meaning and suggesting or representing instead the sound for "near something." [1]

Another excellent illustration—this time in connection with proper names—is often cited. The name of one of the early Mexican kings was *Itzcoatl* meaning "knife-snake." In one of the early manuscripts—the Le Tellier Codex—the name of this king is represented pictorially

[1] *Op. cit.*

by a serpent, *coatl,* with stone knives, *itzli,* upon his back (Fig. 7); but in another manuscript—the Vegara Codex —the name appears in rebus form; that is, the different syllables of the name are represented by pictures the sounds of which are practically the same as those of the syllables. The first syllable, *itz,* is represented by a weapon armed or ornamented with blades of obsidian, *itz(tli);* and second, *co,* by an earthen pot or kettle, *co(mitl);* and the third, *atl,* by the sign for water, *atl,* placed above the pot (Fig. 8). Pictorially this combination would read "weapon-kettle-water"; in rebus fashion, that is phonetically, it gives the sound or word *Itzcoatl.* In the same manner, as Hoffman points out, we might represent the English word *whiskey* by the pictures of a whis(kbroom) or whis(kers) and a key.

Fig. 7.

The application of the rebus principle appears to have been very common among the Nahuas of Mexico in pre-Columbian days. Not only was it applied to place and proper names but, as Brinton points out, the Nahuas "composed in it words, sentences, and treatises on various subjects." Furthermore, as will appear later, these people were probably in the act of evolving an alphabet when the Spaniard arrived. The newcomer naturally hastened this process so that the well ordered syllabary and alphabet in evidence in post-Columbian manuscripts must be in large part ascribed to extraneous influences. Not only did the missionary thus hasten the systematization of the syllabary and the arrival of an alphabet, but

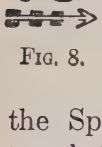

Fig. 8.

he utilized in a very interesting manner the native's ability to read in rebus fashion, not merely as a medium of communication but as a means of memorizing Latin formulas. *Pater Noster,* for example, was represented by a flag, *pan(tli);* a stone, *te(tl);* a prickly pear, *noch(tli);* and another stone, *te(tl)* (Fig. 9).

The Mayas of Yucatan represented an even more advanced stage of civilization than the Nahuas. However, much less is known regarding the actual status of their written language. Unfortunately their manuscripts—which were lacking neither in number nor in elaborateness—met with deliberate and wholesale destruction at the hands of the invaders. Moreover, the Maya language and such manuscripts as survived have received much less attention from the scholarly priest of the early days than did those of the Nahuas. This accounts in part for our lack of information. While it is generally conceded that the Mayas had reached the rebus stage, the actual extent of their achievements within this is in doubt. The Landa alphabet published in 1864 seemed to show that they had passed the rebus stage and had actually developed an alphabet of twenty-seven characters. This together with a certain number of syllable signs and a few ideograms was supposed to afford a key to their writings. However, as Brinton points out, subsequent "experience has proven the utter fallacy of any such hope" and the real key, if such there is, remains still to be determined.

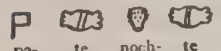

Fig. 9.

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CHAPTER III

THE EVOLUTION OF WRITTEN LANGUAGE—THE PHONETIC STAGE

III. *The phonetic stage.*—The distinguishing characteristic of the phonetic level of graphic language development appears in the fact that signs have come to represent sounds quite irrespective of their meaning. All previous development tended toward this end. The simplification of signs as well as their repeated use under given circumstances resulted in the more or less conventionalized sign; the gradual convergence of spoken and written language led to a very intimate association between graphic signs, meanings, and spoken words; and finally, by the use of the rebus device spoken words with a variety of meanings came to be designated graphically —either on the word or on the syllable basis—by means of pictures or signs of things having similar sounds but different meanings—the latter being ignored. This brought written language to the very threshold of the phonetic level—the rebus being to all intents and purposes for the time being a phonogram. All that remained to be done now was to perfect the process. It was necessary that signs—both spoken and graphic—should be completely abstracted from the complexes involving both signs and meanings. This being accomplished, it was possible to select certain graphic signs to represent invari-

ably certain sounds—words, syllables, and letters. And this is exactly what happened. However, the process was a long and intricate one and by no means all the languages which entered the race reached the final goal.

1. *The verbal phonogram.*—The phonograms of the early phonetic stage are for the most part verbal and syllabic. That is, the signs which have come to represent sounds may stand for whole words, for syllables, or for both words and syllables. The principle of the rebus, however, is such as to facilitate syllabification. Few, if any, polysyllabic languages remain, therefore, long on the verbal level.

The Chinese language as an example of the verbal level.—The Chinese language represents the most remarkable instance of a language remaining permanently on the verbal level. In part this is no doubt due to the fact that it is a monosyllabic language and that syllabification in our sense of the word would be quite out of the question. In any event, the development of this language—upon reaching the phonetic level—has taken a radically different course from that of most others. Although compelled to steer clear of many of its intricacies, it will be of interest for us to note some of its salient features.

To begin with, the colloquial and the written languages are quite distinct. The former consists of a number of related dialects which differ about as widely among themselves as the several Romance languages—French, Spanish, and Italian. Of these the Pekingese or Mandarin—the official language—is the most prominent. The written language, on the other hand, is uniform throughout

China and resembles one dialect about as much as another.

In spite of its vast vocabulary—some 44,000 words—the Chinese language has a very limited number of sounds, simple verbal sounds in the case of the dialects and simple phonograms in the case of the written language. The Pekingese, for example, is said to have only 420. This means of course that any one sound must serve many different meanings. In other words, the Chinese language contains an unusually large number of homophones—words of like sound but different meaning. Fortunately the average Chinaman can get along very nicely with a vocabulary of from 4000 to 5000 words. But even then there are on an average some ten meanings for each sound, and some sounds must in the very nature of the case be taxed much more heavily than others. The word *man*, for example, serves some 600 different meanings. Difficult as the situation may appear, the Chinese have dealt with it in an altogether interesting and ingenious manner—in the case of both the dialects and the written language.

In connection with the spoken language, a variety of devices are employed to bring out the different meanings of the homophones. One of the most important of these involves the use of different tones—the even upper, the even lower, the rising, and the falling in the case of the Pekingese—the meaning varying with the modulation of the voice. Another common device is to employ the homophones in pairs—the meaning depending upon the combination. These pairs are made up in various ways, but very frequently the first member of the pair merely

serves to determine the second by indicating which of the several meanings is intended. Thus in the case of *milk-skin* meaning cream, the word *milk* designates very specifically the particular kind of *skin*—there being many different kinds of *skin*.

The written language, although differing from the dialects, represents, nevertheless, much the same problems and characteristics. An elaborate system of picture writing appears to have been developed at an early stage—the written characters of to-day being very obviously worn down pictures. The pictograph had come to represent most of the common objects of everyday environment and along with it came the ideograph—two trees side by side implying a *forest;* three trees, *density;* the sun above the horizon, *dawn;* sun and moon combined, *brightness;* woman and child, *good;* several persons under a roof, a *home*. At this point the Chinese took another normal step in advance. They selected—doubtless gradually—a considerable number of signs or characters already in use in connection with picture writing and converted them into phonograms by causing them to stand for spoken words. The words thus borrowed from the spoken language were of course for the most part homophones. How these homophones were made to bring out the different meanings for which they stood in the case of the colloquial has been indicated. Fortunately the homophones were less of a problem for the written language. All that was needed was some graphic device attached to each phonogram to indicate invariably—somewhat after the fashion in which the *milk* of *milk-skin* indicates the kind of *skin*—which of the several possible

meanings was intended. The Chinese accordingly began to use their basic characters—pictographs and ideographs —as such devices. Among the different meanings of the homophone *fang,* for instance, were location, room, fragrant, inquire, and hinder. To bring out these meanings, there was added to *fang,* location, the character for *earth* giving *earth-fang;* to *fang,* room, the character for *door* giving *door-fang;* to *fang,* fragrant, the character for *herb* giving *herb-fang;* to *fang,* inquire, the character for *words* giving *words-fang;* to *fang,* hinder, the character for *woman* giving *woman-fang.* By combining these two kinds of characters—the phonograms and the devices or determinatives—the Chinese are able to represent graphically practically all their words. The pronunciation of the phonograms of the written language differs, however, so strongly from the pronunciation of the corresponding words used in the dialects and, in addition, written expression is so terse and abbreviated in character that there can be no such thing as oral reading in our sense of the word. The reader of a manuscript simply interprets to his listeners as he goes along. The various methods of combining words and characters, it must be pointed out finally, have not only solved the problems presented by the homophone but that of absorbing the terminology of Western thought as well. There appears to have been no occasion whatsoever to introduce new characters for this purpose. An elevator became a "rise-descend-machine"; parliament, a "discuss-govern-country-assembly"; and the absolute, the "exclude-opposite."

With all this, the Chinese written language is, to say

the least, a very cumbersome medium for recording and communicating thought. In order to become proficient in its use an individual must commit to memory an enormously large number of different characters. The expenditure of time and effort demanded for the mastery of these characters is out of all proportion to that required for the mastery of a Western language. Such a written language constitutes obviously a very serious obstacle to popular education and the enlightenment of the masses. In spite of this, repeated efforts to modernize the system of writing through the adoption of an alphabet have uniformly failed. According to recent reports, however, official steps have finally been taken and the Pekingese dialect has been transliterated on the basis of an alphabet of some 39 characters. We are told that the characters were chosen from existing Chinese forms and that they will continue to be written in vertical order so there may be a minimum of departure from established practices.[1]

2. *The syllable as phonogram.*—The syllabic level—on which signs stand for syllables rather than for whole words—is often reached very early during the phonetic stage and in the case of polysyllabic languages not infrequently at the very outset. The rebus device, as indicated earlier, facilitates this step. A series of pictures—each suggesting the sound of a syllable—comes to stand for a polysyllabic word. Frequently—by what is known as the principle of acrology—only the first syllables of the names of the pictures are used to represent the sounds of the syllables of these polysyllabic words. As time goes on, the pictures thus used lose all other significance and so

[1] *World's Work,* 38: 244-45.

become pure phonograms; and they tend to become stereotyped in form and conventional in use. Unfortunately there are often many different signs or phonograms for any one syllable. A carefully worked out syllabary—such as the Japanese Katakana in which each syllable of the language is represented by only one sign—is a late phenomenon in the evolution of written language and represents conscious selection rather than natural growth. Most syllabaries have, therefore, been very cumbersome. Those of Egypt, Babylonia, and Assyria are good examples. And even Japan to this very day—in so far as it uses a syllabary at all—prefers to use the Hiragana, a syllabary representing some 300 signs, rather than the Katakana which represents only 47.

The Japanese language as an example of the syllabic level.—Little is known of Japanese writing before the eastward expansion of Buddhism during the sixth century A.D. At this time the Japanese came in close contact with Chinese civilization—including the system of writing. They mastered the latter in a comparatively short time and adopted it as their own. They had now two quite distinct languages—the colloquial Japanese and the written language of the Chinese. They were not content to rest here however. Almost immediately they set to work to devise a written system of their own. And by the close of the ninth century they had actually evolved two syllabaries—the Katakana and the Hiragana—their colloquial having been resolved into 47 syllables. The Katakana represents 47 signs—one for each syllable—these being abbreviated forms of the Chinese square characters; the Hiragana which is most com-

monly used contains some 300 signs—several for each syllable—the characters having been derived from the Chinese cursive forms.

Once these syllabaries had been evolved, the Japanese had in their possession instruments by means of which they were able to write their colloquial almost as readily as we do our own. Unfortunately, however, the Chinese system had gained such a strong foothold by that time that the use of the syllabaries was relegated largely to women and to popular writers—scholarly works and official documents being invariably couched in Chinese. With all this, some of Japan's most treasured literary works appear in the vernacular.

As time went on, pure Chinese came to be supplanted by the so-called Sinico-Chinese in which the borrowed Chinese characters are incorporated into the Japanese sentence much as Greek and Latin words are absorbed in English. There was this important difference, however—and here is the rub. When we borrow foreign terms we represent them by means of letters of our own alphabet. The Chinese characters which entered into the Sinico-Chinese were not represented by means of the syllabaries. They remained ideographs—each retaining its distinct Chinese form. They merely underwent inflection by the use of Japanese particles selected from the syllabaries. Sinico-Chinese—in which most of the important works of to-day appear—is, therefore, a mixture of Chinese characters and Japanese syllables. The former supply the chief ideas—as the nouns and the stems of verbs—while the latter are used to transcribe the particles and terminations and to clear up the meanings of the Chinese ideo-

graphs to those who are not thoroughly familiar with them. The Japanese student faces, therefore, if anything, a more prodigious task in learning to read and write than does the Chinese—being compelled, as he is, to master both the Chinese characters and the syllabaries of his own vernacular. The necessity of assimilating the terminology of Western thought has made the task still more difficult. Almost without exception the new terms have been borrowed from the Chinese—the characters being combined to express the new ideas in the case of both the vernacular and the written language,—democracy becoming "people-power"; philanthropy, "universal love-heart"; photograph, "copy-truth"; phonograph, "gather-voice-contrivance"; electricity, "lightning-spirit"; geology, "earth-substance-science."

It is not surprising, therefore, that there should be in evidence a growing dissatisfaction with the present system—its inadequacy being felt most keenly by those interested in the education and enlightenment of the masses. Even now the necessity of reaching the masses —for political, social, and economic reasons—compels the leading newspapers and journals to publish their articles in the vernacular or in Sinico-Chinese accompanied by what amounts to practically interlinear translations. Thoroughgoing reform is, therefore, only a matter of time.

3. *The letter as phonogram.*—The syllabic phonogram, as we have seen, marks a great advance over the word phonogram. However, it is only a step in the right direction. The final goal is reached only when syllables have been further analyzed and each elementary sound has

TABLE I

SYLLABLES OF JAPANESE LANGUAGE—ARRANGEMENT BASED ON THE FIVE VOWELS AND THEIR COMBINATION WITH CERTAIN CONSONANTS

	Vowels	K	S	T	N	H	M	Y	R	W
A	a	ka	sa	ta	na	ha	ma	ya	ra	wa
I	i	ki	shi	chi	ni	hi	mi	yi [1]	ri	wi [2]
U	u	ku	su	tsu	nu	fu	mu	yu	ru	wu [2]
E	e	ke	se	te	ne	he	me	ye [1]	re	we [2]
O	o	ko	so	to	no	ho	mo	yo	ro	wo

[1] Duplicates.
[2] Duplicates.

come to be represented by a phonogram commonly known as a letter. That this goal is reached only gradually in consequence of a long drawn out period of development is well attested by the history of such alphabets as are known to us. What is more, the fact that many peoples renowned for marked achievements along other lines have failed to evolve alphabets shows that the step is indeed a very difficult one.

As in the case of syllabification, the principle of acrology appears to have played an important part in the development of the alphabet. Very frequently signs standing for syllables or words came to stand for the initial elementary sounds of such syllables or words. In this way an elementary sound might at first be represented by a number of different signs. That this was actually the case is clearly shown by such alphabets as the Egyptian. As time went on, the number of signs was of course reduced. However, even to-day few alphabets have reached the point where each sound is represented

by only one sign. Nor do most alphabets make adequate provision by means of separate characters for all the elementary sounds represented by their respective languages. In part this is due to the fact that alphabets are largely the product of a more or less haphazard development rather than the outcome of conscious selection. Moreover, it must be borne in mind that alphabets have not infrequently been transmitted from one language to another with little or no adaptation. Finally, spoken language is constantly undergoing changes so that no alphabet can—without constant adaptation—continue to represent its sounds with absolute fidelity.

Ancient systems of writing which reached the alphabetic level.—The cuneiform and the Egyptian hieroglyphics are the most remarkable examples of the ancient systems of writing which in the long course of their development finally reached the alphabetic level.

The cuneiform.—The cuneiform is the wedge shaped script used successively by the ancient nations inhabiting the Euphratean and neighboring regions. These wedge shaped characters were developed out of a rude picture writing by the Sumerians—the pre-Semitic inhabitants of these regions—in remote antiquity, possibly from 6000 to 7000 years before the beginning of our era. These people had not only developed a syllabary but they had utilized writing to a remarkable extent. When later the Semitic Babylonians conquered the Sumerians, they adopted much of the culture of the conquered people, including the cuneiform script. This they gradually adapted to their language—a language radically different from the Sumerian—but in spite of the fact that they in-

troduced many changes as time went on, their syllabary appears to have remained rather cumbersome and unwieldy. Their inscriptions—extending from approximately 4500 B.C. to the beginning of our era—appear in cuneiform. It is now known that they developed a literature of considerable merit; that they had extensive libraries in towns and temples—the inscriptions being on clay tablets many of which have come down to us; and that women as well as men learned to read and write.

The Assyrians likewise used the cuneiform script throughout the period of their national existence—dating from 1500 B.C. to 607 B.C. They simplified the Babylonian syllabary to a considerable extent, though there still remained some 500 characters. Sometime during the eighth century B.C. the Scythic tribes of Media came in contact with the cuneiform script of their neighbors, which they adopted—simplifying it subsequently to such a remarkable extent that only 96 characters remained. The outcome was, of course, a syllabary in the real sense of the term. Finally in the time of Darius the cuneiform passed into the hands of the Aryan Persians who developed what may be termed an alphabet of some 36 characters—whether through their own inventive genius or through external influences is not known. We may add that for many centuries of our era—in fact, down to the eighth century—the cuneiform script was practically forgotten, and it was not until sometime during the nineteenth century that scholars rediscovered the keys which enabled them to read the inscriptions.

The Egyptian hieroglyphics.—The Egyptian script has an equally interesting though perhaps less fortuitous his-

tory. At a comparatively early period in Egyptian civilization it had passed through the several stages which we have enumerated. Indeed, the oldest inscriptions thus far unearthed—inscriptions running back some 5000 years from the beginning of our era—show that the alphabet had arrived even at that early period. Strange to say, however, the Egyptians failed to utilize to any extent the advantages of their discovery. They continued to use, along with words properly indicated by means of letters, both syllabic signs and ideographs—the outcome being a very cumbersome system of writing. In the course of time three different kinds of alphabetic characters came into use—the hieroglyphic, the hieratic, and the demotic. The hieroglyphic characters were the lineal descendants of early picture writing forms—many of them preserving their original design to a remarkable extent. In time they came to be used largely for monumental and sacred purposes. The hieratic characters were simplified forms of the hieroglyphic and were used chiefly for secular purposes and in copying literary manuscripts. The demotic —coming into use about 900 B.C.—represented a further simplification and were in popular everyday use. The Egyptian alphabet consisted originally of 45 symbols but in time the number was reduced to 25.

Origin of modern alphabets.—As Clodd points out, "we travel backward along clearly marked lines from our own alphabet to the Roman, and thence to the Greek, which tradition attributed to the Phœnician." Here, however, we come face to face with queries which may never be fully answered. As is commonly known, the Phœnicians were not an inventive people, nor do they, for that

matter, appear to have claimed the distinction of having originated their own system of writing. They attributed it rather to the Egyptians. And for a time the findings of modern philologists pointed in this direction. As late as 1859 the French Egyptologist, Emanuel de Rougé, announced—after a most painstaking comparison of the oldest Phœnician characters with the Egyptian hieratic forms—that the Phœnician alphabet was clearly of Egyptian origin. For a time De Rougé's conclusions were generally accepted.

More recently, however, the results of extensive excavations and investigations in Greece and especially on the island of Crete on the part of such scholars as A. J. Evans and Flinders Petrie have raised the whole question anew. These explorations show that there existed in the Grecian Archipelago a great civilization—a civilization which rivaled the Babylonian and the Egyptian and extended perhaps over nearly as much time as the latter. This civilization, now commonly known as the Mycenean—although its cradle appears to have been in Crete—came in close contact with Mediterranean peoples and with the great civilizations of the day. Of chief interest to us, however, is the fact that two systems of writing have been discovered in Crete—the one pictographic and the other linear and possibly to some extent alphabetic. The extent to which the linear script is indigenous appears to be an open question, particularly since some of the signs bear a rather close resemblance to Cypriote, Hittite, and Semitic forms.

However that may be, the significant facts for us are (1) that there was in wide use among the Myceneans an

elaborate system of writing long before their civilization was overthrown by the invasion of the Dorians—sometime during the twelfth century B.C.—and (2) that the commercial greatness of the Phœnicians followed upon this—extending from the eleventh to the fourth century B.C. This sequence of events gave the Phœnicians every opportunity not only to come in contact with the Mycenean system of writing but to appropriate it and to disseminate it among the Greeks in general. In any event, before the final Phœnician decline came, their alphabet had been perfected and widely disseminated among the Greeks. On the other hand it must be borne in mind that the Phœnicians—because of the fact that they were a dependency of Egypt for several centuries preceding their rise into prominence—also had every opportunity of coming in contact with the Egyptian system of writing and of appropriating the alphabet from this source. Finally, as Clodd points out, it is not improbable that the Phœnicians may have received elements from various sources. As a commercial people they were primarily interested in brevity, so much so that—from whatever source they may have received their cues—they ended up with an alphabet so simple and "of such signal value as to have been accepted by the civilized world of the past and to have secured, with but slight modifications, a permanence assured to no other invention of the human race. Therefore, the debt we owe these old traders is in no wise lessened because the current theory of the derivation of our alphabet is doubted." [1]

From the eighth century down to 323 B.C. when Alex-

[1] Clodd, Edmond: *The Story of the Alphabet,* pp. 177–178.

ander the Great sacked Tyre, the Greeks gradually "succeeded to the sovereignty of the sea. Their factories and colonies were planted from East to West, from Odessa to Marseilles." In this way the Greek alphabet was spread. "The Latin and through it the alphabets of Europe and America" were derived from the Western or Chalcidian form.[1]

The evolution of the book.—Once written language reached the phonetic level, it was of the greatest importance that methods and means should be devised whereby thought could be easily recorded and rapidly duplicated. Primitive man, as we have seen, inscribed his records upon a great variety of objects—objects varying all the way from splints of bone to massive rock façades. Peoples reaching the higher levels of language development have almost without exception evolved more elaborate and more highly specialized materials. The Mayas of Yucatan and the Nahuas of Mexico—whose remarkable linguistic achievements were discussed elsewhere—had reached the point where they manufactured large sheets of paper—from the leaves of the maguey plant—which upon being folded were inclosed between two handsomely decorated boards. Tablets of a great variety were in use among many early peoples. The Egyptians—probably before the days of papyrus—used wooden tablets upon which they wrote with ink. The early Greeks and Romans used tablets made of soft metals and of wax. The most remarkable tablets of which we have any records, however, are those which were in use among the ancient Babylonians and Assyrians. These were made of clay

[1] Clodd, Edmond: *Op. cit.*

somewhat after the manner of brick. The inscriptions—in cuneiform characters—were impressed upon the surface before the tablets were dried in the sun or in ovens specially designed for this purpose. Many of these have come down to us in excellent condition.

The roll was, however, by far the most important manuscript form in use among ancient peoples. The Egyptians began to use the papyrus roll—papyrus being manufactured from the papyrus plant which grew in the shallow regions of the Nile—at remote times, possibly at a period antedating 4000 B.C. A number of sheets of papyrus—usually not more than twenty—were pasted together end to end to form the roll, the width of the roll varying from four to twelve inches. The text was written on the inside—the side on which the fibers ran in a horizontal direction—in columns varying in width from two to two and one-half inches, the lines running parallel to the length of the roll. When it was read the roll was manipulated much as an ordinary camera film, the right hand attending to the unwinding and the left to the reverse process—column after column being disclosed to the reader. At a comparatively early date the use of the papyrus roll spread to other nations—especially the Greeks and the Romans—among whom it came to be used not only for literary purposes but for commercial transactions as well. Among the Ionian Greeks and the Hebrews the roll appears to have been made more commonly of skins—the law of the latter people being to this day inscribed upon rolls of parchment. The Romans continued to use the papyrus roll until well into the fourth century A.D. when it was gradually super-

seded by the vellum codex. Among the Arabs, however, it continued to be used down to the ninth and tenth centuries when paper took its place.

The codex which gradually superseded the roll is the common manuscript form of the Middle Ages and the immediate forerunner of the modern printed book. In general appearance it bore a close resemblance to the book—the sheets of vellum or parchment, manufactured from the skins of animals, being fastened on one side and placed between covers. As compared with the roll, the codex represented certain advantages which were no doubt partly responsible for its rapid adoption once it became known. It was more economical. Not only were the sheets used on both sides, but it was possible to effect erasures and use the parchment over and over again. Moreover, the page arrangement greatly facilitated ready reference. Finally, the codex became at an early age identified with the new religion—a fact which was greatly in its favor.

The introduction of paper.—The Chinese appear to have manufactured paper from a very remote period—possibly as early as the second century B.C. Sometime during the eighth century A.D. the Arabs became acquainted with the process through Chinese war prisoners. They seem to have appreciated the advantages of the new writing material, for in a comparatively short time we find them manufacturing their own paper from a variety of materials. During the succeeding centuries the process gradually became known to the various European peoples. By the fifteenth century paper had practically supplanted vellum.

It is difficult to appreciate fully the significance of this new writing material. It began to supply a relatively cheap and abundant medium for manuscript purposes at a time when the intellectual interests of Europe were growing apace. Moreover, we are warranted in believing that it prepared the way for one of the most momentous inventions of all times—the invention of printing. It is far more than coincident that printing was invented just at the time when paper had come into common use. Indeed, without an abundant medium upon which to print there could have been little incentive to produce such an invention.

The invention of printing.—The Chinese are said to have practiced printing from engraved blocks during the early centuries of the present era. By the eleventh century they had invented movable types. But as far as we know the process did not spread beyond Japan. In any event printing from movable blocks appears to have been invented quite independently in western Europe about the middle of the fifteenth century. The invention as such has been generally attributed to Johann Gutenberg of Mainz, Germany. However, there have been many rival claimants—the most ably defended of these being Lourens Janszoon Coster of Haarlem, Holland. For the most part the supporters of the latter contend—and not without a certain amount of plausible evidence—that the Mainz printers had conceived their idea from earlier inventions on the part of Coster. However that may be, the significant facts, as Aldis puts it, are that the "development of the invention may be referred to the decade 1440-1450" and that "it was at Mainz that the art was

first developed to a practical issue" and, finally, that "it was from Mainz that this momentous invention spread throughout Europe." [1]

The spread of printing.—The new invention was destined to spread rapidly. In large part, no doubt, this was due to the fact that printing met a genuine need of the times—so much so that the printer was readily received wherever he went. More immediately, however, the rapid spread was occasioned by the sacking of Mainz by Archbishop Adolphus in 1642. This dispersed the printers—first over Germany and then throughout Europe. Before the end of the fifteenth century, eighteen European countries were printing books, according to Rawlings,—Italy heading the list with seventy-one cities in which presses were at work, Germany following with fifty, France with thirty-six, Spain with twenty-six, Holland with fourteen, and England with four.

According to early Spanish authorities printing was introduced into America in 1535—the first book being printed in Mexico City. The first printing establishment in North America, exclusive of Mexico, was organized in 1639 at Harvard College. It is still in existence, being known as the University Press. The second colonial press appears to have been established in Boston in 1676.

The improvement of printing.—The simple Mainz press—modified slightly from time to time—continued to meet the needs of printing down to the beginning of the nineteenth century—a period of nearly three hundred and fifty years. Then followed a series of inventions which almost completely revolutionized printing. At the

[1] Aldis, H. G.: *The Printed Book.*

beginning of the nineteenth century the maximum output of the hand press then in use was limited to two hundred and fifty impressions per hour. By the middle of the century—largely because of inventions which resulted in the application of steam and in the development of the cylinder press and the type revolving machine—it was possible with a proper grouping of machines to secure an output of as many as 20,000 impressions per hour. This advance had of course a far reaching effect upon newspapers and magazines. Those which had hitherto "been limited in their ability to furnish the papers rapidly increased their issues, and many new ones were started." The inventions of the second half of the century—culminating in such machines as the rotary web press and the linotype—have wrought improvements which fall little short of the miraculous. Not only do the large newspaper presses of to-day print with lightning speed—the latest double octuple press turning out 300,000 eight page, 150,000 sixteen page, or 75,000 thirty-two page newspapers per hour—but they cut, fold, paste, and count the papers as they are delivered in absolutely finished form from the press.

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CHAPTER IV

ENGLISH SPELLING—PRESENT STATUS AND PENDING SIMPLIFICATION

It now becomes our task—after tracing the evolution of written language from crude pictography to alphabets and printed books—to examine more closely the alphabet to which we have fallen heir. Theoretically an alphabet should represent one character for each sound in the language, and each sound should be represented by only one character. There should be no omissions and no duplications. Such an alphabet would be truly phonetic and would constitute the greatest possible boon for a language. Problems of spelling and pronunciation would scarcely exist since a normal individual would be able to spell a word upon hearing it and pronounce it upon seeing it. Such a language could be readily acquired by children and foreigners; and, furthermore, it would be economical for the printer and the reader since there would be no surplus characters.

Unphonetic character of modern alphabets.—Unfortunately the alphabets of the more important modern languages are not generally phonetic. The Spanish and the Italian come perhaps as close to it as any, while the English and the French deviate most widely. Of the latter, French represents without question the looser re-

lationship between symbols and sounds, but its spelling is simpler than that of English.

Authorities are generally agreed that alphabets tend to grow less phonetic—unless consciously adapted from time to time as in the case of the Spanish and the Italian. Spoken and written language forms represent tendencies which are essentially at variance—the former changing continually; the latter becoming more and more stereotyped and fixed. It must be borne in mind, too, that an alphabet may acquire irregularities in passing from one people to another. This is exactly what happened when the Roman alphabet became our own. Linguistic admixtures—such as followed upon the Norman conquest—act in the same manner.

The English alphabet.—Unfortunately the English alphabet has become quite incapable of representing the sounds of the language in an adequate and consistent manner. As a matter of fact it has never met our needs any too well. It was from the very beginning a better instrument to represent the sounds of Latin than those of Old English. Nevertheless, it was for centuries a relatively phonetic alphabet—its present inadequacy being due largely to subsequent changes in the sounds of the language, especially those involving a progressive differentiation and displacement of vowel sounds. As constituted at present the English alphabet although consisting of twenty-six characters represents only twenty-three sound symbols—*k* making *c* superfluous and *q* and *x* being of no intrinsic service. Our speech sounds on the other hand are variously estimated from thirty-eight to forty-four. In other words, we are attempting to repre-

sent on an average approximately two speech sounds through each alphabetic symbol. Nor is this all, for it is the vowel situation which introduces the most serious complications. We have from fifteen to eighteen vowel sounds and only five characters to represent them. The consonant situation is far more satisfactory since the twenty-four sounds are represented by eighteen characters exclusive of the three which are superfluous.

Vowel characters representing several sounds.—As Professor Lounsbury [1] points out, "to make up for this deficiency of letters, two courses lay open to the users of English; rather two courses were forced upon them": It was possible on the one hand to represent two or more sounds by means of one character; on the other hand certain combinations of vowels, consonants and vowels, or consonants might be chosen to represent invariably certain sounds. Unfortunately the first course was for the most part adopted—there being only two instances in which combinations, made available by way of the second course, "have an invariable or nearly invariable value. One of these is *aw* found in such words as *bawl* and *lawn*" and "the other is *ee* seen in *seen* itself as well as in a number of other words." All other combinations or digraphs came to represent now one sound and now another. This being the case each of the several vowel characters has come to represent a variety of sounds. In consequence of which *a* is found in such

[1] The illustrations of this and succeeding pages have been drawn for the most part from Professor Lounsbury's *English Spelling and Spelling Reform*—a book which should be read by every intelligent individual who speaks the English language.

words as *father, fall, ask, am, care, late, about; e* in *be, let, there, pervert; i* in *ice, ill, machine, bird; o* in *note, not, lord, wolf, work, do;* and *u* in *rule, but, full, urn.*

Vowel sounds represented by a variety of characters and combinations of characters.—Nor does this tell the whole story. If each of the several groups of vowel sounds—the different sounds of *a* for instance—were consistently represented by one and the same symbol or combination of symbols, the situation would be less involved. But such is not the case, for many of the vowel sounds may be represented by a variety of characters or combinations of characters. Thus the *a* in *father* is represented by *ua* in *guard, ea* in *heart,* and *e* in *sergeant;* the *a* in *am* by *ua* in *guarantee,* and *ai* in *plaid;* the *a* in *care* by *ai* in *hair, ay* in *prayer, e* in *there,* and *ei* in *their;* the *a* in *fall* by *o* in *song, au* in *taught, aw* in *saw, oa* in *broad,* and *ou* in *thought;* the *a* in *late* by *ai* in *hail, ay* in *day, ea* in *steak, ei* in *veil, e* in *eh, ao* in *gaol,* and *au* in *gauge.* The *e* in *be* is represented by *ee* in *meet, ea* in *bean, ei* in *seize, ie* in *believe, ay* in *quay, ae* in *aegis,* and *i* in *machine;* and the *e* in *let* by *a* in *any, ea* in *health, ai* in *said, ay* in *says, ei* in *heifer,* and *eo* in *leopard.* The *i* in *ice* is represented by *y* in *type, ie* in *die, ye* in *lye, ei* in *height, ai* in *aisle, ey* in *eye,* and *uy* in *buy;* and the *i* in *ill* by *y* in *system, e* in *English, e* in *pretty, o* in *women, u* in *business, ie* in *sieve,* and *ui* in *build.* The *o* in *note* is represented by *oa* in *boat, oe* in *toe, ou* in *shoulder, ow* in *snow, ew* in *sew, oo* in *floor, eau* in *beau,* and *eo* in *yeoman;* and the *o* in *not* by *a* in *what.* The *u* in *rule* is represented by the *o* in *move, oe* in *shoe, oo* in *fool, ou* in *youth, ue* in *true, ui* in *fruit, eu* in *neuter, ew* in *sewer,*

ieu in *adieu;* the *u* in *full* by *o* in *wolf,* and *oo* in *foot;* the *u* in *but* by *o* in *love, ou* in *touch, oo* in *blood;* and the *u* in *urn* by *e* in *her, i* in *fir, o* in *work, ea* in *learn,* and the *ou* in *flourish.* The three diphthongs *ai, ou,* and *oi* are also irregular. The sound of *ai* is represented by *i* in *hide, y* in *type, ie* in *lie, ye* in *lye, ei* in *height, ey* in *eye,* and *uy* in *buy;* that of *ou* by *ow* in *now;* and that of *oi* by *oy* in *boy.*

Irregularities in case of digraphs.—The many digraphs, as Professor Lounsbury continues to point out, are characterized "by the same variableness, the same irregularity, and the same lawlessness," *aw* and *ee* constituting the only exception. Thus *ai* is found in *fail, pair, said, aisle,* and *plait; ay* in *lay,* and *quay; ea* in *beast, weather, heard, bear, heart,* and *great; ei* in *veil, seize, their, height,* and *heifer; ey* in *they,* and *key; eo* in *people, leopard,* and *yeoman; ie* in *chief, lie,* and *friend; oa* in *oar,* and *broad; oe* in *foe, shoe,* and *does; oo* in *moon, wood, flood, door;* and *ou* in *thou, you, soul, ought, would, cough,* and *flourish; ow* in *down,* and *blow.* Digraphs in which *u* is the first letter have their own peculiar irregularities. Thus *u* may have the sound of *w* as in the *ua* of *language,* the *ue* of *conquest,* the *ui* of *anguish,* and the *uo* of *quota.* It may be long as in the *ue* of *true,* or it may be silent as in *fatigue.* Finally, *ui* is found in words varying as widely in pronunciation as *guide, build,* and *fruit.*

Relationship between vowel sounds and vowel characters in Spanish.—The reader will find it of interest at this point to note—by way of contrast—the utter simplicity of the Spanish vowel system as summarized below:

The Spanish vowels are *a, e, i, o, u,* and occasionally *y*. Each vowel has one invariable sound.

The sound of *a* is full, open as in *far, father, farm, alarm.*

The sound of *e* is an intermediate sound between *a* in *mate* and short *e* in *met,* as in *eh! weight.*

The sound of *i* is the same as in *police, machine.*

The sound of *o* is as in *for, order, lord, form.*

The sound of *u* is the same as short *oo* in *wool,* or *u* in *bull, pull, push.*

All vowels should be clearly and distinctly sounded in all cases, except *u* in the syllables *gue, gui, que, qui,* when it is usually silent. When sounded in *gue, gui,* it is marked with a dieresis, thus: *güe, güi.*[1]

The consonant situation.—Fortunately our consonant system is—in spite of numerous exceptions—comparatively phonetic. "Were it otherwise, were there," as Professor Lounsbury puts it, "with the consonants the same degree of irregularity which exists with the vowels, the same degree of variableness in the representation of sounds, the same widely prevalent indifference to analogy, knowledge of English spelling would not be delayed, as it is now, for no more than two or three years beyond the normal time of its acquisition; it would be the work of a life time. Mastery of it, under existing conditions never fully gained by some, would in such circumstances never be acquired by anybody who learned anything else." [2] As it is, there is in evidence in connection with our consonants a marked tendency for each character to represent one sound only and for each sound to be represented regularly by the same character. Unfortunately there are six consonantal sounds for which our alphabet makes

[1] Appleton's *New Spanish Dictionary,* p. v.

[2] *English Spelling and Spelling Reform,* pp. 160–161.

no provision. These are the hard initial sound in *then,* the soft initial sound in *thin,* and the sounds represented by *ng* in *bring, ch* in *church, sh* in *ship,* and *s* in *pleasure.* The first two are invariably represented by *th* and so do not give rise to orthographic complications, but the reader is left without any adequate rule regarding pronunciation. In connection with the remaining four sounds confusion is inevitable. The combination *ng* has different values in *singer* and *finger; ch* represents not merely the *ch* sound in *church* but it appears in *chaise, character, archangel,* and *choir;* the sound of *sh* in *ship* is represented also by *ce* in *ocean, ci* in *social, s* in *sugar, t* in *satiate, ti* in *nation, xi* in *anxious, sci* in *conscience,* and *si* in *vision;* and the *s* in *pleasure* is represented by *si* in *occasion, z* in *azure,* and *zi* in *glazier.*

Silent letters.—The prevalence of silent letters—letters which have been rendered useless through changes in pronunciation and in some cases letters which have found their way into our words by way of derivation or through error of one kind or another—constitutes another defect in our consonant system. Thus we have a *g* in *gnaw,* a *k* in *know,* a *w* in *wrong,* an *l* in *could,* a *ph* in *phthisic,* a *b* in *climb,* an *n* in *autumn,* a *w* in *plow,* an *h* in *oh,* a *k* in *sick,* a *b* in *debt,* a *c* in *scene,* a *g* in *sign,* an *h* in *ghost,* a *p* in *receipt,* an *s* in *island.* Moreover, double consonants commonly represent a single sound. Accordingly, we have a useless *d* in *add,* a useless *f* in *affairs,* a useless *g* in *egg,* a useless *l* in *will,* a useless *m* in *commerce,* a useless *r* in *arrive,* a useless *s* in *professor,* a useless *t* in *battle,* and so *ad infinitum.* Occasionally one character represents more than one sound. Thus the *p*

of *cupboard* has the sound of *b*, and *f* in *of* has the sound of *v*. In some cases a simple consonant sound is represented by a digraph. The sound of *f* in such words as *philosophy* is accordingly represented by *ph* and the sound of final *t* in such verb forms as *looked* by *ed*.

Causes leading up to present irregularities.—It is scarcely necessary to adduce further evidence in support of the contention that our English spelling is irregular and anything but phonetic. We shall, therefore, turn our attention to some of the causes which have given rise to the present situation. In part these have already been referred to. We have seen, for instance, that the alphabet which we inherited from the Romans did not fully meet our needs at the start. It has also been pointed out that much confusion resulted from such linguistic admixtures as followed upon the Norman conquest. Moreover, it must be borne in mind that we have continued to borrow words to this very day—in fact, borrowing plays the same part in the growth of our vocabulary as compounding does in the case of the Chinese. Fortunately we have drawn most heavily upon Latin—a fact which accounts for many of the regularities found in our spelling. But we have by no means confined our borrowing to Latin. In some instances we have drawn freely upon such sources as the French, Scandinavian, Dutch, Italian, and Russian languages. That this promiscuous borrowing—in the absence of proper adaptation—should lead to orthographic irregularities was of course quite inevitable.

But the chief cause of the irregularities in our spelling must be sought for elsewhere. Nor is it difficult to find. Before the advent of the printer and the compiler of the

dictionary, spelling tended on the whole to keep pace with the changes in speech. It was, therefore, relatively phonetic. With all this there were, as might be expected, many irregularities and much variation—each one spelling within certain limits much as he pleased. The standards for a given period were of course largely determined by the professional scribes—on the whole a capable and scholarly body of men. With the coming of the printer the control of the standards passed into the hands of a body of men inferior in scholarship and primarily interested in conventionality. Moreover, there were—during the early centuries of printing—no authoritative dictionaries to guide the printer. Consequently spelling—which was becoming more and more stereotyped under the influence of the printer—varied much from place to place.

When the compilers of the dictionary arrived on the scene in earnest—during the seventeenth and eighteenth centuries—they were unfortunately not equal to the task before them. Their respect for tradition far outweighed their knowledge of English. Accordingly—instead of adequately tracing the history of words and selecting the simplest and most phonetic forms—they lent their sanction to many of the irregularities which had already become dear to the hearts of men. In large part this was done under the guise of derivation—not infrequently false derivation—for men like Johnson were sticklers for tradition and standpatters rather than scholars. As Professor Brander Matthews points out:

> It was a grave mistake that the mismade spelling thus casually manufactured was accepted by Bailey, and after him by Dr. Johnson whose *Dictionary* published in the middle of the eighteenth

century gave it currency and authority, which his more ignorant disciple Walker only helped to extend and establish. And if the English language has to-day the worst spelling of any of the modern languages, this is due largely to the weight of his ponderous personality. If he had only known just a little more about the history of his own language, and if he had exerted his dominating influence against the more obvious absurdities and inconsistencies foisted into our spelling by the narrow pedantry of arrogant proofreaders, secure in a perilous half-knowledge—in short, if Dr. Johnson had not only known more about English but had also cared more—our orthography would be less unsatisfactory to-day and it would be more easily set right.

In his regard for Latin, and in his ignorance of English as it had been before the printers came, Johnson accepted *comptroller,* ignoring the older *controller.* He allowed *sovereign* and *foreign* (as though they had something to do with the Latin *regno*) instead of the older *soverain* (Milton's *sovran*) and *forrain.* He countenanced *debt* and *doubt,* with the useless and disfiguring *b,* which was thrust in by earlier pedants. He kept a Latin *p* in *receipt,* though he left it out of *deceit.* He spelled *deign* one way and *disdain* another. He was willing to leave a needless and misleading *s* in *island,* although it had been *iland* in Shakespeare's time. He seems to have supposed that the older English *agast* would look more ghostlike if spelt *aghast.* He cast out the Shakespearean *ake* for the labored *ache.* He kept up the accidental and perfectly useless distinction in the spelling of the final syllables of *accede* and *exceed,* of *precede* and *proceed.*[1]

Since the days of Johnson, English scholarship has thoroughly unraveled the many problems connected with the history and derivation of our words. In consequence we have to-day a motley array of dictionaries—dictionaries unsurpassed in excellence and completeness by those of any other language. In spite of this our spelling—although relatively uniform throughout the English-speaking world—has remained irregular and unphonetic. To be sure there have been many changes—some for the

[1] *Simplified Spelling,* pp. 5 and 38.

better and some for the worse—but through all these years there has been at work no recognized standardizing agency such as the French Academy and similar bodies in other countries, notably Spain and Italy. The best that our dictionary compilers could do, therefore, was to represent the situation as it is, indicating the variations in spelling and sanctioning—as many have done consistently—the use of the simpler forms. Any further step would have brought upon them the anathema of the traditionalist. In consequence progress has been slow.

Social bearings of present system of spelling.—The character of our spelling affects our interests from various angles. Ever since the beginning of the last century the English language has been gaining in influence, so much so, in fact, that it now far outclasses in numbers using it, its nearest competitors—the Spanish, French, and German languages. That it is rapidly assuming an international status is obvious. Indeed, we are not far amiss when we predict that there is but one obstacle—the unphonetic and irregular character of its spelling—to prevent it from becoming a world language in the course of the present century. Then, too, for decades to come we as Americans will be confronted with the problem of assimilating the immigrant. The extent to which language affords the key to Americanization is astounding—though all too little appreciated. Here, too, the character of our spelling stands in our way.

Beyond this, the character of our spelling reacts unfavorably upon the educative process. Not only does it impose upon normal English-speaking children an unreasonable spelling grind, but it complicates almost beyond

comprehension—as will appear in the next chapter—the problem of teaching children to read. Nor is this all, but as Professor Calvin Thomas points out:

> Right at the threshold of life, when the young mind is beginning to ask for the reason of things, and when every principle of sound education requires that this propensity be developed and strengthened by appropriate stimuli and discipline, just then we deluge the learner with an avalanche of irrationality. It is strictly true that the foolishness of our English spelling exerts a poisonous influence on our whole primary education.[1]

Again in spite of the fact that we devote approximately one half of the time in our elementary schools to the language arts—reading, language, spelling, and penmanship—the American child leaves this division of the educational system on the whole meagerly equipped with skill in the use of language—in part at least because of the character of our spelling. Nor are these difficulties entirely obviated in succeeding divisions. Many a high school teacher of English is compelled to devote much of his time to the correction of the faulty spelling of the pupils. And as for college students, the writer is forced to conclude, after an intimate classroom experience with hundreds of senior college and graduate students, that few ever reach the point where they have really mastered a guide to pronunciation such as Webster's key or the scientific alphabet used in the Standard Dictionary.

Spelling reform.—As indicated earlier, changes in spelling are by no means foreign to our language. But unfortunately, because of the absence of a controlling influence, these have been for the most part haphazard—

[1] *The Amelioration of Our Spelling*, p. 38.

now for the better and now for the worse. Because of changes for the better, we now write *set, dim, fish, public, era, fantasy, wagon, fruit, forgetfulness, honor, dog, music,* instead of *sette, dimme, fysshe, publick, aera, phantasy, waggon, fructe, forgetfullness, honour, dogge, musique.* On the other hand because of changes for the worse, we now write *downfall, downhill, miscall, unroll,* which appeared in Johnson's dictionary as *downfal, downhil, miscal, unrol;* also we write *kissed, blessed, looked, tossed* although these appear in the original works of our earlier poets as *kist, blest, lookt, tost.*

Reform in order to be effective must obviously be controlled and directed. As far as method of procedure is concerned, two courses are open—one radical and the other gradual. A radical reform would involve the adoption of a phonetic alphabet—one in which each of the forty or more sounds in our language would be represented invariably by one and the same character. The scientific alphabet—also known as the N. E. A. alphabet —represents such a group of characters, although the added symbols are probably not sufficiently distinct in form. As Professor Krapp points out, "the advantages of such a reform, if it could be carried through, would be undeniably great. Our spelling would then be logical and systematic. Foreigners learning English would be relieved of one of the chief difficulties which now lie in their way. Both practically and theoretically such a system of phonetic spelling would approach the ideal of the relation which should exist between the spoken and the written word." [1] But as he continues to point out,

[1] Krapp, G. P.: *Modern English,* pp. 174–175.

such a reform is for a long time to come quite out of the question—in part because "the English-speaking race," as Professor Brander Matthews has put it, "is not logical" and "never has been captivated by any thoroughgoing scheme of reform. In law, in politics, in life generally the two nations who have English for their mother tongue have always revealed themselves as opportunists content to take their reform piecemeal, going forward tentatively and advancing very slowly." [1] More immediately a radical scheme is out of the question because the problem is neither understood nor appreciated by the majority of the educated English-speaking public—not to speak of the masses. A preliminary educative campaign extending over many years would, therefore, be quite indispensable. And the gradual introduction of the most urgently needed improvements may after all constitute the best method of waging such a campaign.

History of reform movement.—In any event the reform movement—now well under way—is proceeding upon the principle of gradual improvement. The movement may be said to date back to 1875 when the American Philological Association appointed a committee to consider the problem of spelling reform. In 1883 the Philological Association and the Philological Society (London) issued a joint report—a report which contained recommendations for a rather thoroughgoing simplification. Meanwhile spelling reform associations had been organized both in this country and in England—their object being to promote the adoption of the recommendations made by the philologists. In spite of the able personnel

[1] *Cyclopedia of Education* (Paul Monroe, Editor), Vol. V.

of these organizations no practical reforms were achieved for years, partly because the proposals for simplification were somewhat too sweeping—to start with at least—and partly because the funds which these societies had at their command were entirely too inadequate to insure effective campaigns. The first practical step was taken by the N. E. A. in 1898 when it adopted the following simplifications:

tho	*for*	though	thoroly	*for*	thoroughly
altho	*for*	although	catalog	*for*	catalogue
thru	*for*	through	decalog	*for*	decalogue
thruout	*for*	throughout	pedagog	*for*	pedagogue
thoro	*for*	thorough	program	*for*	programme
thorofare	*for*	thoroughfare	prolog	*for*	prologue

These spellings were henceforth used in the publications of the association and by a number of educational journals.

The Simplified Spelling Board.—In 1906 the Simplified Spelling Board was organized—its immediate object being "to promote by systematic and continued effort the gradual simplification of English spelling." The organization began its work under auspicious circumstances. It drew its membership from such sources as "the American Philological Association, the Philological Society (London), the Spelling Reform Association, the Modern Language Association of America, the National Education Association, the American Association for the Advancement of Science, and other representative bodies of scholars and educators, as well as from the front rank of men of letters and men of affairs"; and it received the financial backing of Andrew Carnegie—which enabled it

to carry on an effective educational campaign from the very outset. In 1908 a similar organization—the Simplified Spelling Society—was formed in England.

Policy of the Simplified Spelling Board.—The policy of the Simplified Spelling Board has from the outset been one of moderation. One of its chief aims has been to create a consciousness on the part of the American public regarding existing conditions and to direct attention toward the desirability of reform. At no time has the Board proposed sudden or sweeping reforms. It recognizes the fact that there are—in spite of great irregularities—many rules and analogies in English. These it desires to extend. Accordingly one of its most immediate tasks has been to get rid of needless exceptions and silent letters. In general its recommendations have been based upon the following principles:

(1) When current usage offers a choice of spellings, to adopt the shortest and simplest. EXAMPLES: *blest,* not *blessed* (1 sil.); *catalog,* not *catalogue; center,* not *centre; check,* not *cheque,* or *checque; gage,* not *gauge; gram,* not *gramme; honor,* not *honour; license,* not *licence; maneuver,* not *manoeuvre; mold,* not *mould; plow,* not *plough; quartet,* not *quartette; rime,* not *rhyme; tho,* not *though; traveler,* not *traveller.*

(2) Whenever practicable, to omit silent letters. EXAMPLES: *activ,* not *active*; *anser,* not *answer; bluf,* not *bluff*; *definit,* not *definite*; *det,* not *debt; eg,* not *egg*; *engin,* not *engine; frend,* not *friend; hart,* not *heart; helth,* not *health; promis,* not *promise; scool,* not *school; shal,* not *shall*; *suffraget,* not *suffragette*; *thru,* not *through*; *trolly,* not *trolley; yu,* not *you.*

(3) To follow the simpler rather than the more complex of existing analogies. EXAMPLES: *aker,* not *acre; buro,* not *bureau; deciet,* not *deceit; enuf,* not *enough; maskerade,*

not *masquerade; spritely,* not *sprightly; telefone,* not *telephone; tung,* not *tongue; wize,* not *wise.*

(4) Keeping in view that the logical goal of the movement is the eventual restoration of English spelling to the fonetic basis from which in the course of centuries and thru various causes it has widely departed, to propose no changes that ar inconsistent with that ideal.[1]

It will be observed that these principles do not involve any fundamental readjustment between alphabetic characters and sounds. Such a readjustment will be undertaken gradually as the public becomes prepared for the step—first, doubtless, in connection with the consonants. The initial move might well include, as the Board indicates, "making a definite choice of *c* or *k* for the sound unambiguously represented by *k*" and the substitution of *s* for *c* pronounced like *s*, of *z* for *s* pronounced like *z*, and *j* for *g* pronounced like *j*. Readjustments in the case of the vowels and diphthongs will be much more difficult and will doubtless represent "the last step to a completely simplified spelling."

Activities of the Simplified Spelling Board.—One of the first steps of the Board was to send forth a list of 300 common words of which alternate spellings—one more simple and regular than the other—are given by the leading dictionaries. Those who were in sympathy with the movement were asked to use the simpler forms as far as practicable. Subsequently other lists have been prepared. The most recent contains the following 25 words—issued "in response to requests for a brief list of words in simplified spelling, especially suited for use in

[1] See "Selected References" (4).

business correspondence, to supplement the 12 words of the N. E. A.:

ad	bil(d)	fil(d)	liv(d)	tel
addrest	buro	fixt	reciet	telefone
anser(d)	det	giv	reciev(d)	twelv
ar	engin	hav	shal	wil
askt	enuf	insted	shipt	yu

The Board has also issued from time to time circulars and pamphlets designed to supply needed information. Recently *A Handbook of Simplified Spelling* has been prepared. This offers an account of the origin and history of the movement, arguments in favor of simplification, replies to objections, rules selected for present emphasis, and a dictionary list of the words affected. The following rules—thus far adopted by the Board—will afford the reader a bird's-eye view of the scope embraced by the activities of the Simplified Spelling Board:

NOTE. Words used as illustrations in the rules and examples ar printed in *italics,* if new spellings; in roman, if given as preferd or alternativ spellings by one or more of the leading American dictionaries (Century, Standard, Webster's) and not qualified as "simplified," "new," "obsolete," or the like.

æ, œ, initial or medial. SPEL **e.** EXAMPLES: *ciclopedia,* esthetic, medieval, *fenix,* maneuver, subpena; BUT: alumn**ae,** str**iae,** etc.

NOTE. æ, œ, ar now usually written **ae, oe.** Other cases of **ae, oe,** medial, as in can**oe**ist, G**ae**lic, subpen**ae**d, etc., ar not affected.

bt pronounst **t.** DROP silent **b.** EXAMPLES: *det, dettor, dout, indetted,* redout.

NOTE. RETAIN **b,** if pronounst, in *sub**til***(e).

ceed final. SPEL **cede.** EXAMPLES: *excede, procede, succede.*

ch pronounst like **c** in **c**ar. DROP silent **h**, EXCEPT before **e, i, y.** EXAMPLES: *caracter, clorid*(e), *corus, cronic, eco, epoc, mecanic, monarc, scolar, scool, stomac, tecnical;* BUT: architect, chemist, monarchy.

double consonant before **e** final silent. DROP last 2 letters. EXAMPLES: *bagatel, bizar,* cigaret, creton, *crevas,* gavot, *gazet, giraf,* gram, program, *quadril,* quartet, vaudevil.

double consonant final. REDUCE double to single; BUT in **-ll** only after a short vowel, and in **-ss** only in monosillables. RETAIN gross, hiss, off, puss. EXAMPLES: *ad, bil, bluf, buz, clas, dol, dul, eg, glas, les, los, mes, mis, pas, pres, shal, tel, wil;* BUT NOT: **al** for all, **rol** for roll, **needles** for needless, etc.

e final silent. In the following cases DROP **e**:

a) After a consonant preceded by a short vowel strest. EXAMPLES: bad (bade), *giv, hav, liv,* centiped (when so pronounst).

b) In *ar*(e), *gon*(e), and in *wer*(e) when not pronounst to rime with there.

c) In the unstrest final short sillables **ide, ile, ine, ise, ite, ive,** pronounst as if speld **id, il, in, is, it, iv.** EXAMPLES: *activ,* bromid, *comparativ, definit, determin, engin, examin, favorit, genuin, hostil,* iodin, *imagin, infinit, nativ, opposit, positiv, practis, promis, textil.*

NOTE. The ordinary use of **e** final after a single consonant is to indicate that the preceding vowel has a pronunciation different from that which it would normally hav if the consonant in question wer final, as in bar, bare; hat, hate; her, here; them, theme; sir, sire; bid, bide; con, cone; run, rune. Hence the **e** final is retaind in such words as arrive, care, confuse, fine, mile, polite, ride, rode, and also in bromide, iodine, etc., when pronounst with the **i** of line, side.

d) After **lv** and **rv**. EXAMPLES: *involv, resolv, twelv, valv; carv, curv, deserv, serv.*

e) After **v** or **z** when preceded by a digraf representing a long vowel or a difthong. EXAMPLES: *achiev, believ, deciev, freez, gauz, leav, reciev, sneez.*

f) In **oe** final pronounst **o**. EXAMPLES: *fo, ho, ro, to, wo.*

NOTE. RETAIN **e** in inflections **-oed, -oes**; as foes, not **fos**, hoed, not **hod.**

ea pronounst as in head or as in heart. DROP the silent letter. EXAMPLES: *bred, brekfast, hed, helth, hevy, insted, lether, plesure, welth, wether; hart, harty, harth.*

ed final pronounst **d**. When the change wil not suggest a wrong pronunciation, DROP silent **e**, REDUCING a preceding double to a single consonant. EXAMPLES: *anserd, cald, carrid, delayd, doubld, employd, examind, fild, followd, marrid, pleasd, preferd, recievd, robd, signd, troubld, sneezd, struggld, traveld, worrid, wrongd;* BUT NOT: **bribd** for bribed, **cand** for caned; **changd** for changed, **fild** for filed, **pricd** for priced, **usd** for used, etc.

NOTE. The **e** is retaind only in cases where it has by convention a diacritic use, to indicate a preceding long vowel, or in the case of consonants, **c** sibilant or **g** pronounst **j**.

ed final pronounst **t**. When the change wil not suggest a wrong pronunciation, SPEL **t**, REDUCING a preceding double to a single consonant, and CHANGING **ced, ssed**, final, to **st**. EXAMPLES: *askt, fixt, helpt, indorst, wisht; addrest, kist,* past, *shipt, stopt, stuft; advanst, announst, commenst, invoist, notist; acquiest, effervest;* BUT NOT: **bakt** for baked, **deduct** or **dedust** for deduced, **fact** or **fast** for faced, **hopt** for hoped, etc. (See NOTE to preceding rule.)

ei pronounst like **ie** in brief. SPEL **ie**. EXAMPLES: *conciet, deciev, inviegle, iether, reciev,* wier, wierd.

ey final unstrest pronounst like short **y** final. DROP silent **e**. EXAMPLES: *barly, chimny, donky, journy, mony, pully, trolly, vally,* whisky.

gh pronounst **f**. SPEL **f**; DROP the silent letter of the preceding digraf. EXAMPLES: *cof,* draft, *enuf, laf, ruf, tuf.*

gh pronounst like **g** in gas. DROP silent **h**. EXAMPLES: *agast, gastly,* gerkin, *gost,* goul.

gm final. DROP silent **g**. EXAMPLES: apothem, *diafram, flem, paradim.*

gue final after a consonant, a short vowel, or a digraf representing a long vowel or a difthong. DROP silent **ue**; tongue SPEL *tung.* EXAMPLES: catalog, dialog, *harang, leag, sinagog;* BUT NOT: **rog** for rogue, **vag** for vague, etc.

ise final pronounst as if speld **ize.** SPEL **ize.** EXAMPLES: advertize, *advize,* apologize, enterprize, *franchize,* merchandize, *rize,* surprize, *wize.*

mb final after a short vowel. DROP silent **b.** EXAMPLES: *bom, crum, dum, lam, lim, thum;* BUT NOT: **com** for comb, **tom** for tomb, etc.

ou before **l**, pronounst like **o** in bold. DROP silent **u**, EXCEPT in soul. EXAMPLES: *bolder,* mold, *sholder.*

ough final. SPEL **o**, **u**, **ock**, or **up**, when pronounst as if so speld; SPEL plow. EXAMPLES: altho, *boro, donut, furlo,* tho, *thoro; thru;* hock; hiccup.

our final, with **ou** pronounst as a short (obscure) vowel. DROP **u.** EXAMPLES: color, favor, honor, labor.

ph pronounst **f.** SPEL **f.** EXAMPLES: *alfabet, emfasis,* fantom, *fonograf, fotograf,* sulfur, *telefone, telegraf.*

re final after any consonant except **c.** SPEL **er.** EXAMPLES: center, fiber, meter, theater; BUT NOT: **lucer** for lucre, **mediocer** for mediocre, etc.

rh initial. DROP silent **h.** EXAMPLES: *retoric, reumatism,* rime, *rom* (rhomb), *rubarb, rithm.*

sc initial pronounst as if speld **s.** DROP silent **c.** EXAMPLES: *senery, sented, septer, sience,* simitar, *sissors;* BUT: scatter, scooner, sconce, etc.

u silent before a vowel medial. DROP **u.** EXAMPLES: *bild, condit, garantee, gard, ges, gide,* gild.

y between consonants. SPEL **i.** EXAMPLES: *analisis, fisic,* gipsy, *paralize,* rime, *silvan, sithe, tipe.*

ADDITIONAL SIMPLIFIED SPELLINGS: *aker, anser, burlesk, buro, campain, catar, counterfit, delite, foren, forfit, frend, grotesk, iland, ile, maskerade, morgage, picturesk, reciet, siv, sorgum, sovren, spritely, tuch, yu, yung.*[1]

Progress of the simplified spelling movement.—Once the Simplified Spelling Board was organized, the simplification movement made rapid progress. The list of 300 words was especially well received. It was promptly adopted for permanent use by such organizations as the public schools of New York City, the Modern Language Association of America, and the N. E. A. President Roosevelt adopted the list for his official correspondence and recommended that these simpler spellings be used by the Government Printing Office. State Teachers Associations in all parts of the country indorsed the movement. "Leading periodicals and newspapers, including the *Literary Digest, Independent, Current Literature, Educational Review, Quarterly Journal of Economics, Chicago Tribune,* and *Minneapolis Journal* were prompt to approve the work of the Board and to adopt some of its recommendations." Ten years later—1916—three hundred eighty universities, colleges, and normal schools were either using simplified spellings in their official publications and correspondence or were permitting students to use them in their written work. One hundred seventy of these institutions including seventeen state universities had formally approved the movement for simplified spelling—in most cases by faculty resolution. Four hundred fifty newspapers and periodicals—circulating more than 16,000,000 copies—were using most of the simpler spell-

[1] See "Selected References" (4).

ings recommended by the Board in its first list and more than four hundred had adopted the twelve words of the N. E. A.

The Simplified Spelling Society of Great Britain.—The Simplified Spelling Society of Great Britain has likewise been waging an aggressive campaign since its organization in 1908. During the period of the war its activities were of necessity seriously curtailed, but with the coming of peace plans have been made for more elaborate efforts. The Society is fortunate in counting among its membership many of the Empire's most distinguished linguistic scholars, educators, and men of affairs. On the whole the Society goes somewhat farther in its recommendations than the Simplified Spelling Board. It has gone so far, for instance, as to adopt a phonetic scheme of notation—using, however, only the letters of the present English alphabet. An Imperial Education Conference attended by officially appointed delegates from all the provinces of the Empire—held in London in 1911—strongly endorsed the efforts of the Society. Recently a petition was circulated asking for the appointment of an Imperial Commission to consider the question of spelling reform.

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CHAPTER V

TEACHING BEGINNERS TO READ

Symbols and meanings.—Language, as has been repeatedly pointed out, involves two main factors—symbols and meanings. Accordingly, in learning to read, a pupil must master the graphic symbols of his language and he must become familiar with their meanings—individually and in composition. Teaching beginners to read involves, therefore, two main processes—training in word mastery and training in thought getting.

Form *versus* thought.—One of the first questions confronting the teacher of reading is: Which of these processes—word mastery or thought getting—should lead in a sound method of teaching beginners to read? Historically, as we shall presently see, the emphasis was long placed on form or word mastery. The assumption was that a pupil must necessarily acquire general facility in word mastery before training in thought getting could be received advantageously. The older methods of teaching reading are, therefore, largely concerned with form. And, what is more, they are for the most part synthetic; that is, word mastery begins with drill on given elements—letters, phonograms, sounds—and thought getting is preceded by practice upon isolated word meanings. Logically—from the standpoint of the adult and subject matter—synthetic methods are quite consistent; but

psychologically—from the standpoint of the pupil and his interests—they are essentially inconsistent.

For some time the pendulum has, therefore, been swinging in the opposite direction; so much so, in fact, that it is now generally conceded that reading should be a thought getting process from the very beginning. The newer methods of teaching beginning reading are, accordingly, for the most part *analytic-synthetic;* that is, they proceed from the whole to the part and back again to the whole. There is in evidence a strong tendency to begin with a story—well told—or with some familiar situation and thereupon to lead the pupil to discover sentences, phrases, words, phonic or phonetic elements, and in time even letters. As fast as elements are discovered analytically the pupil is taught to combine them synthetically. Thus connected stories are built out of sentences, sentences out of words and phrases, and words out of phonetic or phonic elements. Such a procedure—although not strictly logical from the adult point of view—is entirely in accord with the needs and interests of children.

Steps in the evolution of modern methods of teaching beginning reading.—As indicated above, the earlier methods of teaching beginning reading emphasized form and were synthetic in procedure while those evolved more recently stress thought and proceed on an analytic-synthetic basis. Some six methods—the alphabet, the phonetic, the word, the phrase, the sentence, and the story methods—are usually enumerated as representative of the steps leading to modern practices. The first three are largely concerned with word mastery and the last three with thought getting.

1. *The alphabet method.*—The alphabet method was in almost universal use among all nations having an alphabetic system of writing until well into the nineteenth century. Among English-speaking peoples it was in common use up to about fifty years ago, and in some instances much longer. In some European countries—notably Germany—it was superseded by other methods somewhat earlier. At its best the method offered little to commend itself. It was a poor instrument for word mastery since it stressed the names rather than the sounds or functions of the letters. Also, it was extremely formal and almost wholly synthetic and so afforded little contact with the needs and interests of children. They began by memorizing the names of the letters. This was followed by prolonged drill upon the spelling and pronunciation of a great variety of letter combinations, syllables, and monosyllabic words. As time went on, the syllabic materials thus acquired were combined into longer and longer words—always, of course, through added drill. That pronunciation was mastered at all was doubtless largely due to the fact that teachers indirectly stressed the sounds or functions of the letters.

2. *Phonetic methods.*—Methods which approach word mastery through the sounds or functions of letters and groups of letters—variously known as phonetic or phonic methods—did not come into common use in this country until about 1870. They had, however, long been advocated by educational leaders in various parts of the world and in isolated instances they had been used for centuries. During the earlier stages these methods were about as formal and synthetic as the alphabet method.

They were to all intents and purposes spelling methods—only the words were spelled by the sounds rather than by the names of the letters. Such methods were obviously poorly suited to a language as unphonetic as the English. They were, therefore, modified in various ways as time went on. As long as the methods remained essentially on the spelling level—spelling by sounds,—the chief task was to find ways and means of designating the sounds graphically. It will be recalled that our alphabet represents on an average little more than one character for every two sounds in the language and that our vowel characters are especially overtaxed—each one representing on an average three or four sounds.

In addition, many sounds in our language—particularly the vowel sounds—are represented by several different characters or groups of characters. Then there are the silent letters. All these difficulties the early advocate of the phonetic methods encountered in full force. He dealt with them in various ways. In some cases he resorted to a scientific alphabet—an alphabet containing as many characters as there are elementary sounds in the language—so that the words to be mastered by the pupils were spelled phonetically. A more common practice, however, was to retain the present alphabet of twenty-six characters and the current spellings and to indicate the pronunciation of the words by means of a system of diacritical marks such as that used in Webster's dictionary. These diacritical marks were not only used in connection with drills for word mastery but in connection with many of the words in the reading selections as well. While phonetic schemes of this kind are quite indispensable as

keys to pronunciation in connection with dictionaries—and pupils in the upper grades should become thoroughly familiar with them—they constitute obviously extremely cumbersome and artificial devices for teaching beginners to read, much more so fortunately than the exigencies of the situation demand.

Progressive leaders in the teaching of primary reading were generally conscious of these defects. At the same time they also appreciated very thoroughly the advantages and possibilities of phonetic methods. They, accordingly, set themselves the task of eliminating the evils as far as possible. In consequence the phonetic methods of to-day—and there are many—are much simpler and far more natural than their predecessors. Words are no longer uniformly resolved into all their elementary sounds. As far as possible they are rather analyzed into the larger and more natural sound units. Frequently—especially in the case of the consonants—these sounds represent simple letter functions. More often, however, they represent the functions of combinations of letters—most commonly combinations of vowels and consonants. These sound units occur again and again in our language and blend very readily in the formation of new words. We shall discuss them more fully later on.

3. *The word method.*—The word method came into use in this country about the same time as the phonetic methods. Like the latter it had been advocated and used from time to time long before. In accordance with this method words are taught as wholes—the sound being associated with the total visual form as a unit. The

Chinese—it will be recalled—must acquire all of his words in this manner. In actual practice the word method works admirably at first but as the stock of words increases it becomes less and less effective since it depends purely upon memory and develops in the pupil no independent power over word mastery. It is, therefore,—as far as word mastery is concerned—primarily an auxiliary method. As such it plays, of course, a very important part in modern methods of teaching beginning reading. It is especially serviceable in supplying the initial stock of words and in mastering later sight words.

4. *The phrase method.*—The phrase method—like the sentence and the story methods—concerns itself with thought getting rather than word mastery. It represents primarily a point of departure. Its advocates contend that the phrase or the functionally related word group constitutes the natural speech unit and that the meanings of many words—especially prepositions and conjunctions —stand out only when they appear in composition. They hold, therefore, that the phrase rather than the word is the natural unit for presentation in teaching beginning reading. Such a method must obviously be supplemented with other methods for purposes of word mastery.

5. *The sentence method.*—The sentence method came into general use in this country after 1885. It is based upon the assumption that the sentence rather than the phrase or the word is the unit of speech and thought and that it should, therefore, constitute the starting point in teaching beginning reading. As advocated by Farnham, who popularized the method in this country, it was rather formal—though distinctly a thought method. The sen-

tences which were used grew out of a conversation between teacher and pupils—the subject of the conversation being unfortunately usually of little interest to the latter. The sentences which the teacher led the pupils to say were written on the blackboard. They were then repeated and rearranged in various ways until the pupils recognized them readily and were thoroughly conscious of the parts—the phrases and the words. In this way the pupils acquired in a rather incidental manner an initial vocabulary of sight words. As far as word mastery on a large scale is concerned this method represents obviously the same limitations as the word and phrase methods. It must, therefore, be supplemented by other methods.

The sentence method—stripped of its one-time formality and unnaturalness—is used by many teachers as a point of departure. The sentences usually grow out of conversations which are of intrinsic interest to children and are recorded in their own language.

6. *The story method.*—The story method—the most recent of reading methods—places the emphasis most completely upon the thought element. In fact it is the culmination of the movement which has given us successively the phrase and the sentence methods; and like these it constitutes, therefore, essentially a point of departure rather than a complete method. It is based upon the assumption that the child's interest is centered in the story rather than in any of its component parts—the word, the phrase, or the sentence. To begin with the teacher tells an interesting story. This becomes the subject of conversation and not infrequently dramatization. Later it is reproduced by the pupils—the teacher

writing or printing it on the blackboard as they proceed. In a comparatively short time the pupils are led through skillfully directed analysis and comparison to discover the parts—the sentences, phrases, and words. In this way they acquire very rapidly a considerable stock of sight words. Like all other thought methods the story method must be—and in actual practice is—supplemented by some kind of phonetic method for purposes of word mastery.

It remains to be pointed out that the so-called story method has many variations. Not infrequently the characterization or depiction of some familiar situation—one in which the child is interested and in connection with which he has had much experience—is substituted for the story. Sometimes the thought material which constitutes the point of departure comes by way of a song or a pleasing jingle. In any event—whatever the form or the content—the essence of the method appears in the fact that the teacher sets out with a reasonably complete thought unit—one of intrinsic interest to children—and proceeds thereafter in an analytic-synthetic manner.

Modern methods of teaching beginning reading.—It is obvious from what has been said that modern methods of teaching beginning reading must be essentially composite. Almost without exception they represent elements drawn from every step or method which we have enumerated. The best of these methods are invariably thought methods. They set out with a fairly complete and interesting thought unit—a story, a characterization of some familiar situation, a song, or a jingle. The procedure is distinctly analytic-synthetic. The pupils first

grasp and appreciate the whole. Then they become conscious of the parts—the sentences, phrases, and words—while these are being rearranged in various ways. Finally they are led to combine the parts into new wholes. In this way pupils not only accumulate—in a more or less incidental manner—an initial vocabulary but they acquire a genuine interest in reading.

If the initial vocabulary has been wisely chosen by the teacher, it will constitute an excellent point of departure for the phonetic work which must of necessity come in at this point in some form in any effective method of teaching beginning reading. That is, some of the words of this vocabulary will be of the kind which readily resolve themselves into natural sound units. Pupils are led to discover these sound units much as they discovered the sentences, phrases, and words of the larger thought units. As fast as they become conscious of the sound units they are led to combine or blend them into word wholes much as they combined the words, phrases, and sentences into new thought units. The two processes—thought getting and word mastery—are of course very different but they are governed by the same general principle—the procedure being in each case analytic-synthetic. If properly directed in their phonetic work pupils acquire in a comparatively short time the ability to master independently the great majority of the new words which they encounter in connection with their reading. This adds of course greatly to the pleasure of reading. If the phonetic work is neglected—as sometimes happens—pupils are compelled to acquire new words in a purely haphazard fashion and to retain them by sheer

force of memory. That such a procedure will seriously interfere with the pleasure and the effectiveness of reading is obvious.

An examination of current methods or systems of teaching beginning reading shows a tremendous variation in the emphasis given to phonetic work. On the one extreme there are the methods which represent highly elaborate phonetic schemes. For the most part these have been developed by teachers who have a thoroughgoing understanding of the English language and who appreciate the problem of word mastery in the technical sense. Unfortunately they do not always have as complete an understanding and appreciation of child nature and of the learning process. In consequence such methods are often extremely formal and logical from the standpoint of the primary pupil. They compel him—far in advance of any apparent need—to memorize a vast array of phonograms and to combine them into innumerable words many of which he may never have occasion to use. That such methods develop word mastery—provided the teachers are prepared to use them—is not to be denied for a moment. Indeed, they do it and in a very effective manner. The only difficulty is that they force upon the child an unnecessary burden and an artificial regimen which tend to make the teaching of phonetics for the time being an end rather than a means.

On the other extreme there are the methods which have practically discarded all direct teaching of phonetics. In part—indeed, in no inconsiderable part—these have arisen in protest to the formalism of the methods on the other extreme. Not infrequently such methods have

been developed and are being promoted by teachers whose appreciation of child nature far exceeds their understanding of the English language. In many cases they are enthusiastic and fairly successful teachers of primary reading—enthusiastic because they understand and appreciate child nature and fairly successful because they have at their command a considerable phonetic equipment which they use more or less indirectly and unconsciously. The weakness of such methods becomes most obvious when they fall into the hands of teachers who have little or no phonetic equipment and so are compelled to carry them to their logical conclusion. In such cases pupils must of course acquire new words by the word method—one by one as separate and distinct entities—at least until they learn to spell. Thereafter they will in the very nature of the case resort to the alphabet method—the sounds or functions of the letters coming to their aid indirectly.

Fortunately—although the extremes represent no inconsiderable following—the majority of modern methods of teaching word mastery falls somewhere between these two extremes and approximates, therefore, a more wholesome procedure. Most of the leaders in primary education understand and appreciate children too well to subscribe to methods which are unnecessarily formal and artificial, and they have too keen an understanding and too thoroughgoing an appreciation of the function of intelligence to condemn the child to approach word mastery on a purely trial and error basis. With all this the situation is far from satisfactory. Recent surveys of reading achievements have shown quite conclusively that

many children do not master the mechanics of reading in the primary grades—the situation being of course much more serious in some communities than in others. In consequence they are in the very nature of the case seriously handicapped in connection with much of the work which they are expected to do during the succeeding period. In some cases this condition is clearly due to insufficient phonetic work; in others, possibly in the great majority of cases, it is obviously the outcome of too much diversity in phonetic procedure—one teacher using one method and another another. As a matter of fact the bearings of such diversity are about as serious as those of neglect. Phonetic methods—although each may be relatively proficient in itself—differ too widely to be used indiscriminately in school systems where pupils change teachers several times while learning to read. There is, therefore, without question room for much improvement in the teaching of phonetics; not only do we need more phonetic work in many instances but there is urgent need above all for greater uniformity in the phonetic methods used in given communities—cities, counties, and states.

The basis of phonetics.—In the last chapter we discussed at length the unphonetic character of our spelling. It was pointed out that there are many more sounds in our language than letters in our alphabet—there being approximately forty-four sounds and really only twenty-three letters since three of the twenty-six have no independent functions. The vowel situation was shown to be more serious than that of the consonants since there are from fifteen to eighteen vowel sounds and only five vowel

characters. This means of course that any one letter must serve as a symbol for several different sounds—sometimes for as many as eight sounds as in the case of the letter *a*. We found that the situation is further complicated by the fact that a sound is not infrequently represented by several characters or groups of characters—the *a* in *care,* for instance, being represented by *ai* in *hair, ay* in *prayer, e* in *there,* and *ei* in *their.*

Then there are the silent letters. If it were not for these irregularities, the problem of phonetics—and consequently the problem of teaching word mastery—would be a comparatively simple one as is actually the case in such countries as Spain and Italy. There would be one letter for each sound of the language, and each sound would be represented by only one letter. In such a situation the teacher's task would be limited very largely to training children in uttering and blending the sounds. There could be no associative difficulties since the sounds of the letters would be about as invariable as their names. As it is, however, the task of the English-speaking teacher is much more complicated. Not only must she train children in uttering and blending a greater variety of sounds than the Spanish or the Italian teacher but she must deal with a rather involved associative problem. In fact, she must teach children the sounds of our language and the phonograms—the letters and combinations of letters which represent them under given conditions.

Fortunately the phonetic problem of the English-speaking teacher is not as impossible as might appear on the surface. Once she has mastered the forty-four sounds of the language and the phonograms which represent

them under given conditions, she finds to her great surprise that the vast majority of the syllables of the language—the monosyllabic words and the syllables entering into the polysyllabic words—are phonetic, in the sense that the relationship of the letters tends to indicate the correct pronunciation. As Burbank points out:

> *Can* is phonetic because each letter has its usual sound; *cane* is phonetic because the final *e* shows that *a* is long; *car* is phonetic because *r* shows that *a* has the so-called Italian sound; *call* is phonetic because the *ll* shows that *a* has the sound of *au* in *haul,* or *aw* in *law* or *bawl,* which is the same as *ô* in *corn*; *rage* is phonetic because the final *e* shows that *a* is long and *g* soft.[1]

When the relationship of the letters does not indicate the pronunciation—or is misleading—the syllables are unphonetic as in the case of *done, have, give, whose, does, says.* Burbank, who has made an exhaustive study of phonetics from the standpoint of the teacher of reading, points out that fully 86 per cent of English monosyllables are phonetic in the sense indicated above. An analysis of the 2386 words of the Jones list—selected from the reading vocabulary of children of the first three grades and comprising a total of 3405 syllables—showed that monosyllables tend to be phonetic in about the same ratio, the percentages being almost identically the same. It is here—in the tendency on the part of English syllables to conform to phonetic principles—that we find the basis for phonetic work in connection with the teaching of word mastery. Because of this phonetic consistency

[1] Burbank, E. D.: "Phonetics in the Elementary Grades for Teachers of Normal Children." *The Volta Review,* Vol. XXII, No. 3, p. 3.

which governs the words of our language in spite of their irregular spelling, children may in a comparatively short time—on the basis of certain facts and a given amount of consistent training—arrive at the point where they are able to master independently the vast majority of the new words which they encounter in connection with their reading. The unphonetic words—constituting less than 14 per cent—must of course be mastered as sight words.

Phonetic facts and principles.—The teacher who is to direct children in word mastery should in the very nature of the case be well versed in the field of phonetics. This constitutes part of her indispensable equipment and so should feature prominently in her training. Without going into detail we shall enumerate at this point some of the most important facts and principles—the elementary sounds of the language, the phonograms which represent these, and the phonetic principles which govern them—with which the teacher should be familiar:

1. *The elementary sounds.*—While the number of elementary sounds in the English language has been variously estimated—the estimates varying all the way from thirty-eight to forty-four or more—the following list of forty-four sounds, which consists of nineteen vowels and twenty-five consonants, has been generally accepted:

Vowels—a (mat), a (mate), a (fast), a (car), a (care), e (met), e (mete), i (pin), i (pine), o (not), o (note), o (for), u (cut), u (cute), u (hurl), oo (room), oo (book), oi (oil), ou (out);

Consonants—b (bee), p (peep), m (may), w (we), wh (why), v (view), f (few), th (then), th (thin), d (do), t (ten), l (little), n (no), r (ray), z (zeal), s (so), j (joke),

ch (chin), zh (azure, fusion), sh (she), y (yet), g (garden), k (kill), ng (singer), h (hide).

2. *Phonograms.*—The forty-four elementary sounds enumerated above are represented by the following phonograms:

Vowels—a, e, i, o, u, and w and y as end equivalents for u and i. In the earlier phonetic methods—as indicated elsewhere—the vowel phonograms were not infrequently modified, either by a change in the form of the letter or by the addition of so-called diacritical marks, in order that the different sounds might be indicated directly. At present these devices are rarely used. The short sounds of the vowels, which are by far the most numerous, are considered basic and are taught first—all other sounds being readily recognized through position.

Vowel digraphs—oo, au, aw, ai, ay, ee, ea, ie, oa, oe, ow, ue, ew. With the exception of oo which represents the long and short vowel sounds in such words as room and book and au and aw which are used as equivalents for *o* in *corn* and *for,* the vowel digraphs are generally used as long vowel equivalents—the first letter having its usual long sound and the second being silent.

Diphthongs—oi, oy, ou, ow. These are made by the union of two vowels.

Consonants—b, c, d, f, g, h, j, k, l, m, n, p, q, r, s, t, v, w, x, y, z.

Consonant digraphs—sh, ch, tch, ck, ng, nk, th, wh.

3. *Phonetic principles.*—Burbank gives the following summary of the more important phonetic principles: [1]

[1] Burbank, E. D.: "Phonetics in the Elementary Grades for Teachers of Normal Children." *The Volta Review,* Vol. XXII, No. 5.

I. Vowels are short except when modified by position: up, cot, cut, sat, scratch, notch, fetch, flung, with.

II. Final *e* lengthens the preceding vowel: cube, plate, tube, shade, rose, size, glade, robe, mete.

III. In most vowel digraphs the first vowel has its own long sound and the second vowel is silent: heap, rail, slay, roar, tie, hue, sleep, plea, hoe, own.

IV. Vowels followed by *r* have their sounds modified, making the *murmur diphthongs*: stir, mar, clerk, churn, jerk, cur, dirt, her, sir, corn.

V. There are four diphthongs made by the union of two vowels in each case: oi (oil), oy (boy), ou (out), ow (cow).

VI. The *c* is soft before *e, i,* and *y;* otherwise it is hard. The *g* is generally soft before *e, i,* and *y;* otherwise it is hard: ice, city, fleecy, can, cut, cot, gem, gin, gipsy, got, gun, gang.

VII. In open accented syllables the vowel is usually long: no-ta-tion, na-tion, di-ner, fry, so, ca-liph, me.

VIII. The *a* before *l* usually has the same sound as au in haul or aw in law: all, ball, bald, malt, talk.

IX. Long *u* and its equivalents have the sound of *oo* after *r, j,* and *l* preceded by a consonant, and after the *sound of sh*: rule, grew, June, jute, flute, flew, blue, sure, chute.

X. The *o* after *w* usually has the sound of *u*: work, won, wont, word, worst, worth, worry, wonder, worship.

XI. The *a* after *w* or *wh,* or its equivalent, usually has the sound of *o*: was, wash, what, squat, squad, warm, war, quart.

XII. Silent letters: *k* before *n*: knee, knife, knit, know, knave; *w* before *r*: wrap, write, wreath, wrist, wretch; and in who, whom, whose, whoop, sword, answer; *gh* after a vowel: flight, sigh, straight, height, caught, through, plough, daughter, laugh; *b* after *m* or before *t*: climb, dumb, lamb, thumb, debt, doubt, subtle; *t* as in often, castle, hasten, listen, whistle; *g* before *m* and *n* final and initial before *n*: phlegm, sign, feign, reign, gnat, gnaw, gnash; *l* as in could, would, calm, palm, salmon, almond, talk, walk, calf, half, folk.

The blend.—Sounds may be combined in various ways to form larger wholes. This has given rise to two quite distinct types of phonetic methods. In accordance with

the first of these, vowel sounds are blended with final consonant sounds to form what are commonly known as simple word endings or family names—the more difficult of these being usually taught as sight phonograms. Thereupon initial consonant sounds are combined with these word endings to form monosyllabic words. Thus the sounds *s, f, h, t, p, n, m, r, a,* and *i*—once pupils have become familiar with them—may be blended into such word endings as *an, at, am, ap, in, it, im,* and *ip.* This done, a union may be effected between these word endings and initial consonant sounds—giving such words as *f-an, t-an, p-an, m-an, r-an, s-at, f-at, h-at, p-at, m-at, r-at, h-am, r-am, s-ap, t-ap, n-ap, m-ap, r-ap, s-in, f-in, t-in, p-in, s-it, f-it, h-it, p-it, h-im, r-im, s-ip, h-ip, t-ip, n-ip,* and *r-ip.* In the case of methods of the second type, the initial consonant sounds are blended with the sounds of the vowels following to form the so-called helpers. These helpers in turn are combined with the sounds of the final consonants to form monosyllabic words. Thus the sounds *s, f, h, t, p, n, m, r, a,* and *i* may be blended into such helpers as *sa, fa, ha, ta, pa, na, ma, ra, si, fi, hi, ti, pi, ni, mi,* and *ri.* Thereupon the helpers may be combined with the sounds of the final consonants to form monosyllabic words as follows: *sa-t, sa-p, fa-t, fa-n, ha-s, ha-t, ha-m, ta-p, ta-n, pa-t, pa-n, na-p, ma-t, ma-p, ma-n, ra-t, ra-p, ra-n, ra-m, si-t, si-p, si-n, fi-t, fi-n, hi-t, hi-p, hi-m, ti-p, ti-n, pi-n, pi-t, ni-p, ri-p,* and *ri-m.* Both methods lead pupils to blend consonant sounds which usually go together—*st, fl, br, gl, sk, sc, scr, cr, sm, pr, bl, fr, sl, sp, cl, tr, gr, pl, sn, sw, dr, str, tw, tch,* for example—and to use them as units in blending words.

Phonetic methods of the first type have long been in use and are the most numerous to-day. Methods of the second type are comparatively recent and represent a more radical departure from the former than might appear at first sight. Those who advocate the latter contend that it is easier and more natural to blend the initial consonant with the vowel following than to blend the vowel with the final consonant. In support of this they point out that we use *do, re, mi, fa, sol, la, si, do* in singing to represent the various notes of the scale; that the first consonant sounds of children are blended with vowels following; that the syllables of early languages—as shown by the Japanese syllabary, for example—generally conformed to this principle; and, finally, that we ourselves tend to conform in our speech—the written syllabification of such words as *hunt er, rend er,* and *sat is fac tion* becoming *hun ter, ren der,* and *sa tis fac tion.* Those who have used these methods extensively contend that they make the least possible demands upon children—only from sixty to seventy phonograms being required for the mastery of the 86 per cent of phonetic words in our language—and, furthermore, that they require a minimum of technical preparation on the part of the teacher. While excellent results are constantly being achieved through both types of methods, the relative merits of the two have not been determined experimentally as far as the writer knows. Such an evaluation would be distinctly worth while.

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3. KLAPPER, PAUL—*Teaching Children to Read;* D. Appleton and Company, 1914.
4. SWEET, HENRY—*Primer of Phonetics;* (Oxford), Clarenden Press, 1890.
——— *Sounds of English;* (Oxford), Clarenden Press, 1908.

[1] Among the indispensable references of the student of phonetics and methods of teaching beginners to read are of course the many excellent Teachers' Manuals—too numerous to mention here—which accompany the different series of readers.

CHAPTER VI

ANALYSIS OF THE READING PROCESS THROUGH AN INVESTIGATION OF EYE MOVEMENT

As will appear in succeeding chapters, various methods have been used in the scientific study of the reading process. One of the most interesting of these methods has approached the problem through an investigation of the manner in which the eyes move during the reading act. Contrary to popular opinion, the passage of the eyes across the page is not continuous. It consists rather of a series of movements and stops—the former being commonly designated as *interfixation movements* and the latter as *fixation pauses.* Upon reaching the end of a given line the eye returns—by means of the *return sweep* —to the beginning of the next. The intensive study of these movements and pauses—especially the pauses—has thrown much light upon the nature of the reading process.

Methods employed in the investigation of eye movement.—A considerable period of time was required for the development of the methods and apparatus now commonly used for the investigation of eye movement. Professor Javal [1] of the University of Paris, who as early as 1879 called attention to the discontinuous character of the movement of the eye across the page from left to

[1] See "Selected References" (9).

right, studied the eye movements of his subjects by means of a mirror. This was adjusted in such a manner that it reflected the images of the reader's eyes without obstructing his field of vision. In this way Professor Javal was able to observe the eye movements of his subjects during the act of reading. Although used extensively by later investigators—notably Erdmann and Dodge at the University of Halle—the possibilities of this method were extremely limited since it did not enable the experimenter to measure in an accurate manner the various aspects of eye movement, such as the number and the duration of the pauses and the speed of the interfixation movements and the return sweep. The best that he could do was to estimate roughly the number of pauses which the reader required on an average for the reading of a given line. The microphone method—improvised by Lamare [1]—represented the same limitations. In this case a microphone was fastened to the upper eyelids of the reader. This device magnified the sounds made by the movements of the eyes and thus enabled the experimenter to estimate in a general way the number of pauses which the eyes made as line after line was being read.

Ahrens [2]—while investigating eye movement as related to handwriting at the University of Rostock in 1891—hit upon a device which led to the development of a more objective method. He succeeded in fastening an ivory cup to the cornea of the eye. By means of a pointer fastened to this cup he hoped to record on a smoked surface tracings of the movements of the eyes. Although he se-

[1] See "Selected References" (11).
[2] See "Selected References" (1).

cured no practical results, the attempt was suggestive. Some years later (1897-1899) Delabarre[1] working in the psychological laboratory at Harvard University, used a plaster of Paris cup much in the same manner but without positive results. In the course of the same year, however, Huey [2] succeeded at Clark University—partly at the suggestion of Delabarre—in perfecting a similar apparatus which proved to be very serviceable. In fact the elaborate investigations of reading which Huey undertook subsequently were carried on largely by means of this new apparatus. The plaster of Paris cup was constructed and fastened to the cornea in such a manner that the pupil was left unobstructed. The mechanism of the levers which were fastened to the cup was such that the movements and pauses of the eye were recorded upon a smoked surface and so could be studied after the reading was over. Although far superior to previous modes of approach, this method, too, had its limitations. The duration of the pauses and the speed of the interfixation movements and the return sweep could not be measured with anything like final accuracy. Furthermore, the eye worked under more or less unnatural conditions because of the mechanical attachment. Finally, the apparatus was too difficult to use, and the penalties of carelessness were so great that the method has never come into general favor.

Meanwhile Dodge [3] was devising a new apparatus at Wesleyan University. He was convinced that photography must ultimately offer the most satisfactory mode

[1] See "Selected References" (3).
[2] See "Selected References" (8).
[3] See "Selected References" (5).

of approach. This would furnish the experimenter with a recording medium—reflected light—having no momentum and no inertia and one which would subject the eyes to no unusual conditions. He finally hit upon the plan of photographing the point of a bright pencil of light which was reflected from the cornea of the reader's eye and focused upon a photographic plate by means of a lens and camera. The light which was thrown upon the reader's eye from a small mirror was highly actinic and of low physiological intensity so that it did not in any way interfere with vision. The pencil of light reflected from the cornea behaved exactly like the eye—being now in motion and now at rest. Movements other than those of the eyes were excluded as far as possible by fastening the head in a carefully devised head rest. In order to get a simple and continuous record of the movements and pauses of the eyes—as represented by the movements and pauses of the pencil of light—it was necessary that the photographic plate move continuously and uniformly in one direction—downward in this case. Only in this way could the records of the successive pauses, interfixation movements, and return sweeps be spacially represented and distinguished from each other. When the photographic plate moved downward—as indicated above—the pauses were represented on the records—Plate II—by approximately vertical lines—the length of the lines indicating in a general way the duration of the pauses; the interfixation movements were represented by slightly diagonal lines to the right; and the return sweep by a longer and more diagonal line running in the opposite direction. The apparatus was also provided with an elec-

PLATE II. EYE-MOVEMENT RECORDS

O. Oral
S. Silent
L. Left eye
R. Right eye

1, 2, 3, 4 } Successive lines

x. Interfixation movement
y. Return sweep
z. Refixation

tric time marker which intercepted the pencil of light at regular intervals—say fifty times per second. This device was of great value since it made possible the accurate measurement of the duration of the pauses and the speed of the interfixation movements and the return sweep—these being indicated by the number of interceptions in the lines representing them.

Although Dodge originated the apparatus described above, he did not use it extensively for the investigation of reading as such. Dearborn [1]—working at Columbia University during the school year 1904-05—was the first to use the apparatus on a large scale for this purpose. More recently the laboratory of the School of Education of the University of Chicago has been the scene of several elaborate investigations. During the school year 1913-14 Schmidt [2] investigated the eye movements of eighty-three individuals—twenty-one elementary pupils, seventeen high school students, and forty-five adults—for both oral and silent reading—the investigation being carried on by means of a modification of the Dodge photographic apparatus. Two years later C. T. Gray [3] completed an elaborate study—carried on in part by means of a further modification of the Dodge photographic apparatus—which concerned itself with the reading ability of children. These studies [4] together with minor ones have brought to light many important facts regarding the

[1] See "Selected References" (2).
[2] See "Selected References" (12).
[3] See "Selected References" (7).
[4] Buswell's investigation—*An Experimental Study of the Eye-Voice Span in Reading*—was completed after this chapter had been written.

nature of the reading process. Some of these we shall discuss in the remaining sections of this chapter.

Character of interfixation movements and return sweep.—It has been conclusively established through a long chain of investigations that the eye can receive no distinct visual impressions during the time that it passes from one fixation point to another. Interfixation movements exist, therefore, largely for the purpose of carrying the eye from fixation point to fixation point. Their duration is short—usually from 0.01 to 0.03 second. In the case of a given individual the differences in the durations of these movements are largely due to the fact that the eye must traverse varying distances in passing from one fixation point to another. In some cases the distances are three and four times as great as in others. Then there is of course marked individual variation—the movements of some being uniformly slow and those of others uniformly rapid. The durations of the return sweeps are —as might be expected on account of the greater distances traversed—materially longer than those of the interfixation movements, extending ordinarily from 0.3 to 0.05 second. Both the return sweep and the interfixation movements are accompanied by a divergent binocular adjustment—the eyes moving gradually downward and outward in the course of any one movement.

The fixation pause.—All but an insignificant fraction of the time in reading is spent in pauses. It is during these periods—periods of apparent rest on the part of the eye—that distinct visual impressions are received from the printed page. The pauses constitute, therefore, the period of perception *par excellence*—though it must be

borne in mind always that perception and assimilation as such are continuous processes which proceed essentially uninterrupted by movements and pauses. Because of their prominence and objectivity the pauses have been the chief concern of the investigator—having been studied especially from the standpoint of their nature, number per line, duration, and location within the unit of perception—be this the word, the phrase, or the larger whole.

Although the pause appears to be a period of rest, the eye is probably never absolutely at rest. This is rather in accordance with expectation since perception is so dominantly motor in character. One of the most interesting and significant forms of motor activity observed in connection with the fixation pause is a convergent binocular adjustment during which the eyes move slowly upward and inward. This is of course the counterpart of the divergent binocular adjustment accompanying the interfixation movements and the return sweep.

The average number of pauses per line.—The number of pauses which an individual requires in reading a given line is obviously one of the most important factors in determining his rate of reading. In general the larger the number of pauses the slower the rate and vice versa. There are, however, frequent exceptions since the duration of the pauses also enters in as a determining factor. Detailed quantitative information regarding the number of pauses is comparatively recent since most of the earlier investigations were based upon a very limited number of individuals. Javal inferred on the basis of his mirror observations that there was uniformly one pause to every

ten letters—about 5 pauses to a 90-mm. line. Dodge himself averaged 5 pauses in the case of an 83-mm. line and Erdmann 8 with lines as long as 122 mm. Two of Huey's subjects averaged 4.5 and 4.8 pauses respectively with lines 83 mm. in length; in the case of 52-mm. lines one reader averaged 3.4 and the other 3.8 pauses. Dearborn's readers averaged from 3 to 7.1 pauses with ordinary newspaper lines—an average of from 1.9 to 1.0 word per pause; with lines not quite double this length from 7.5 to 9.4 pauses were required—an average of from 1.5 to 1.1 words per fixation. In general the results of Dearborn's investigation—the first to deal with a considerable number of individuals—gave indication of marked individual variation. The Chicago studies which are based upon larger numbers of subjects show even more striking variations. Schmidt's adult subjects—45 in number—ranged from 4.7 to 10.8 pauses in reading 90-mm. lines silently—the average being 6.5 pauses. In oral reading the range extended from 6.5 to 11.3 pauses per line—the average being 8.2 pauses. The high school students—17 in number—ranged from 5.0 to 9.6 pauses in reading similar materials silently—the average being 7.0. In oral reading the range extended from 7.2 to 10.2 pauses—the average being 8.6. The elementary pupils—21 in number—ranged from 4.1 to 9.3 pauses in reading 90-mm. lines silently—the average being 6.3. In oral reading the range extended from 6.1 to 11.5 pauses—the average being 8.1. In other words, the adults read from 0.93 to 2.15 words per pause silently and from 0.87 to 1.52 words per pause orally—averaging 1.54 words per pause silently and 1.22 words per pause orally; the high school students read from 1.04

to 2.04 words per pause silently and from 0.98 to 1.39 words per pause orally—averaging 1.43 words per pause silently and 1.16 words per pause orally; and the elementary pupils read from 1.04 to 2.44 words per pause silently and from 0.86 to 1.62 words per pause orally—averaging 1.59 words per pause silently and 1.23 words per pause orally.[1]

The duration of the pauses.—Aside from the possible exception of their number, the duration of the pauses is the most important factor in determining the rate of reading. In general, the shorter the pauses, the more rapid the rate of reading and vice versa. Since the measurement of the duration of the pauses requires a rather highly developed technique—much more so than the measurement of their number,—the data on duration are rather recent. Even Huey's technique gave only approximates. Dearborn was the first to secure extensive data. In reading an ordinary newspaper passage the average duration of the pauses of five of his subjects ranged from .160 to .401 second. It should be borne in mind at this point that there is a rather well defined limit—determined in part by the reaction time of the eye—below which the duration of pauses cannot be expected to fall. Dodge quotes visual reaction time averages ranging from .151 to .181 second. Compared with these the lower limit of Dearborn's range is rather exceptional. Schmidt's adult subjects ranged in the case of silent reading from .214 to .470 second—the average being .308; in oral reading the same subjects ranged from .230 to .520 second—the average being .380 second. The high school

[1] *An Experimental Study in the Psychology of Reading*, pp. 39–41.

students ranged in the case of the silent reading from .244 to .414 second—the average being .311; in oral reading they ranged from .306 to .512 second—the average being .372 second. The elementary pupils ranged in the case of the silent reading from .264 to .438 second—the average being .314; in oral reading they ranged from .300 to .524 second—the average being .398 second.[1]

C. T. Gray's results show somewhat lower durations—the averages for the silent reading of some 45 individuals ranging from .174 to .364 second.[2] Much depends doubtless upon the rate at which individuals in connection with a given investigation are told to read—the more rapid the rate, the shorter the durations tend to be. Probably the most striking fact brought out by the several investigations is the tremendous individual variation—the pauses of some being more than three times as long as those of others.

Perception time.—The perception time in the case of a given unit of reading material—such as a line or a paragraph—is obviously the product of the average number and the average duration of the pauses required in reading it. It is essentially the reading time minus the time expended in interfixation movements and return sweep. Since the duration of the latter is short and relatively constant, the perception time furnishes on the whole an excellent index to the rate of reading. Indeed, the perception time averages and ranges obtained through the study of eye movement are in striking agreement with the reading time averages and ranges which have

[1] *An Experimental Study in the Psychology of Reading*, pp. 39–41.
[2] *Types of Reading Ability*, pp. 92–93.

been secured through other modes of investigation. The perception time averages of Schmidt's adult subjects—expressed in terms of the number of seconds expended in connection with the fixation pauses of 90-mm. lines—ranged from 1.14 to 3.68 seconds for silent reading—the average being 2.01; for oral reading the range extended from 1.70 to 4.06 seconds—the average being 3.13 seconds. The perception time averages of the high school students ranged from 1.37 to 3.36 seconds for silent reading—the average being 2.23; for oral reading the range extended from 2.36 to 4.17—the average being 3.20 seconds. In the case of the elementary pupils the perception time averages ranged from 1.19 to 2.96 seconds for silent reading—the average being 1.97; for oral reading the range extended from 2.21 to 4.45 seconds—the average being 3.23 seconds. In other words, the adult subjects perceived from 2.7 to 8.7 words per second when reading silently—4.9 words on an average—and from 2.9 to 5.9 words per second when reading orally—3.2 words on an average; the high school students perceived from 3.0 to 7.3 words per second when reading silently—4.5 words on an average—and from 2.4 to 4.2 words per second when reading orally—3.1 words on an average; and the elementary pupils perceived from 3.3 to 8.5 words per second when reading silently—5.1 words on an average—and from 2.2 to 4.5 words per second when reading orally—3.1 words on an average.[1] The amount perceived by different individuals during a given unit of time—a second in this case—is obviously extremely variable—some perceiving more than three times as much as others.

[1] *An Experimental Study in the Psychology of Reading*, pp. 39–40.

The variation is of course most marked in the case of silent reading.

The fact that reading rate is largely determined by the number and the duration of the pauses raises the question: Which of these factors—the number or the duration—is more influential in determining reading rate? Such correlations as have been computed between these factors and perception time indicate that the number of the pauses is the more influential of the two—the correlation between the average number of pauses and the average perception time per line being almost invariably materially higher than that between the average duration of the pauses and the average perception time. As a rule then, the individual who requires few pauses is more apt to be a rapid reader than the one who uses short pauses. But there are exceptions. Some individuals who require a relatively large number of pauses use such short pauses that they are able to read more rapidly than those who require a small number of relatively long pauses.

Since the reading rate of an individual may ordinarily be materially improved through practice, the question arises: Which of these two factors—the number or the duration of the pauses—yields most to training? In general, experimental evidence shows that improvement in the rate of reading is, during the early practice stages, accompanied by a reduction in the duration of the pauses. However—as indicated earlier—the possibilities for such a reduction are decidedly limited since the lower limits of the duration of pauses are rather arbitrarily determined by the reaction time of the eye. Moreover, as C. T. Gray points out in discussing the results of his investigation, it

is quite possible for individuals to reduce the duration of the pauses to such an extent that reading ceases to be efficient. The remarkable and continued improvement of many readers must, therefore, be achieved primarily through a reduction in the number of pauses. This means of course that progress in the rate of effective reading is largely a matter of acquiring the ability to deal with progressively larger meaning wholes. The results of Gray's investigation show quite conclusively that an individual's ability to deal with large wholes may be materially improved through practice.

The location of pauses.—The earliest observers were inclined to believe that fixations were usually centered upon the middle of words. Huey—whose technique was the first to make possible a relatively accurate study of location—found that this was far from being the case. Indeed, the fixation points were found to fall in almost any part of the words and even in the spaces between them. Dearborn's results corroborated this and brought out in addition certain general tendencies. The "short connective and nonsubstantive words and the prepositional phrases and relative clauses" made on the whole the greatest demands upon fixation—nouns, verbs, adjectives, familiar phrases, and rather long words requiring less attention. In part, too, the precise location was found to be determined by "the more or less artificial peculiarities of spacing, punctuation, and the forms of letters in printing, and by "short-lived motor habits formed in the course of the reading."

Schmidt's results show that there is a tendency to fixate the apperceptive unit centrally—more words being fix-

ated near the center than at the extremes. Pauses located in spaces were usually found to be near the center of two or more words constituting a unit of perception. This tendency toward central location—it is held—is due, in part at least, to the fact that we are in the habit of regarding most perceptual objects as units to start with; "it is conditioned and facilitated on the one hand by contributions from peripheral vision and from context, and interfered with on the other hand by such factors as defective motor control, tendencies toward the formation of short-lived motor habits, and objective peculiarities demanding analysis." It is pointed out, further, that "the words within which the pauses fall do not appear to belong prevailingly to any one class nor to a specific group of classes. In the case of the slow readers especially such a selection would be almost a physical impossibility since most words are fixated at least once. In the case of average and rapid readers many words are bound to escape fixation. These appear to be most frequently short words which combine readily with others to form apperceptive units, the most common of these being pronouns, prepositions, short adjectives, and auxiliary verbs." Finally, it is admitted that there are many exceptions to the tendencies toward central fixation and that "the demands of perception appear in many cases to be met quite as adequately by a fixation near either end of the apperceptive unit as by one centrally located." [1]

The most significant fact brought out by the several investigations of the location of pauses is that the unit of perception varies rather directly with the character of

[1] *An Experimental Study in the Psychology of Reading,* pp. 62–66.

the reader—the more rapid and comprehensive the latter, the more striking the word combination and the larger the unit, and vice versa. For the most part, then, the rapid reader is one who—because of native capacity or training or both—is capable of dealing with relatively large and logical units.

Age differences.—One of the main purposes of Schmidt's investigation was to determine the influence of age and accomplishment upon the various aspects of the reading process. Accordingly, a large and varied group of individuals—ranging all the way from second grade pupils to college students and professors—was examined. It was rather surprising to find that the influence of age does not appear to be marked—aside from the fact that there is of course a normal growth in the capacity to deal with increasingly complex reading materials as individuals advance in age and accomplishment. The results for the three main divisions of this group—adults, high school students, and elementary pupils—quoted above in connection with our discussion of the number and duration of pauses and average perception time per line—show quite conclusively that there are no significant differences which may be attributed to age or accomplishment. The averages for the three groups are practically the same. A more detailed examination of the results of the elementary and high school divisions—as represented by the several grades—shows that there is very little correlation between grade rank and reading efficiency. Thus the second grade required 5.2 pauses per line with an average duration of .348 second when reading silently and 8.9 pauses with average duration of

.469 second when reading orally; the third grade required 9.2 pauses with a duration of .292 second when reading silently and 10.9 pauses with a duration of .315 second when reading orally; the fourth grade required 5.3 pauses with a duration of .363 second when reading silently and 7.6 pauses with a duration of .416 second when reading orally; the fifth grade required 6.6 pauses with a duration of .298 second when reading silently and 8.2 pauses with a duration of .407 second when reading orally; the sixth grade required 6.5 pauses with a duration of .305 second when reading silently and 8.2 pauses with a duration of .408 second when reading orally; the seventh grade required 5.7 pauses with a duration of .300 second when reading silently and 6.6 pauses with a duration of .369 second when reading orally; the ninth grade required 7.5 pauses with a duration of .316 second when reading silently and 8.5 pauses with a duration of .408 second when reading orally; the tenth grade required 6.8 pauses with a duration of .329 second when reading silently and 8.2 pauses with a duration of .378 second when reading orally; the eleventh grade required 6.5 pauses with a duration of .289 second when reading silently and 8.5 pauses with a duration of .372 second when reading orally; and the twelfth grade required 7.6 pauses with a duration of .312 second when reading silently and 9.1 pauses with a duration of .349 second when reading orally.

Evidently second grade pupils who have mastered the mechanics of reading are capable of reading quite as rapidly as pupils in succeeding grades—provided the materials are adapted to their maturity. Nevertheless, as

Schmidt points out, there are in evidence—in the case of the second and third grades—indications which tend to show that reading habits are very loosely established at this stage and that the range of individual variation is likely to be more marked than later on. The striking differences between the silent reading averages of the second and third grades certainly point in this direction. The unusually high oral reading averages of these two grades add further confirmation. The high oral reading average of the second grade is especially striking in view of its marked achievement in silent reading. As might be expected, the extremely complex mechanism which controls oral reading is obviously more loosely established than the much simpler mechanism governing silent reading. By the time pupils reach the fourth grade, however, both oral and silent reading habits—as far as eye movement is concerned—appear to be rather well established, though individual variation may still be somewhat more marked than later on.

C. T. Gray concludes on the basis of his investigation of the eye movements of children that there is a certain amount of correlation between age or grade rank and the number of pauses required in the reading of a given line. He found a rather definite and progressive reduction in the numbers of pauses—much more so than in the case of the durations—as pupils advanced from grade to grade. Thus the third grade required 10.0 pauses with an average duration of .284 second when reading silently; the fourth grade 9.1 pauses with a duration of .250 second; the fifth grade 10.0 pauses with a duration of .276 second; the sixth grade 7.5 pauses with a duration of .250

second; the seventh grade 7.8 pauses with a duration of .272 second; the high school students 6.4 pauses with a duration of .230 second; and the college students 6.9 pauses with a duration of .226 second.[1]

The results of these two studies—although pointing to somewhat different tendencies—are not necessarily contradictory. The differences may be due to differences in the conditions under which the experiments were carried on. Schmidt's subjects read materials which made as nearly as possible equal demands upon the several age and grade groups and his conclusions are limited to reading going on under such conditions. It is quite possible that Gray's materials—as is so often the case—may have made somewhat heavier demands upon the lower grades than upon the upper grades and the adults. Under such conditions a progressive reduction in the numbers of pauses would be in accordance with expectation. Finally, it must be borne in mind that neither of these investigations concerned itself with a given group of children as they advanced from grade to grade. The results for the several age and grade levels are based upon the accomplishments of groups of individuals who happened to be at these particular levels. A study of the first type—in which the same group of children would be measured at the several age and grade levels—would give far more reliable results. Such a study would require years of observation but it would be thoroughly worth while.

Individual differences.—One of the most striking characteristics of the reading process—brought to light through the investigation of eye movement—is the tre-

[1] *Types of Reading Ability*, pp. 91–105.

mendous range of individual variation. As indicated earlier, Dearborn was the first to stress this fact. Each successive study has furnished additional evidence. In general, it is not uncommon for one individual to require twice as many pauses as another or to use pauses which are twice as long as those of another. And some individuals—as shown by the average perception time per line—actually read silently more than three times as fast as others. In the case of children these differences are not infrequently found in the same class and under the best of instruction.

In large part this variation must be attributed to native differences—some individuals simply being born with the capacity to read more rapidly than others. In the case of children in the lower grades, variation is to some extent due to developmental differences. Some children mature more slowly than others and in consequence pass more gradually from slow and cumbersome to rapid and fluent reading. Then there are of course pathological cases—cases which necessitate clinical treatment. In the case of adults slow reading may be—and often is—the result of habit. In such cases—cases in which the actual reading accomplishment of the individual does not approximate the limits set by native endowment—marked improvement may be brought about through conscious endeavor. Finally, the great cause of individual differences in reading—as in most other forms of human behavior—must be sought in native differences—differences which cannot be swept away through training.

Differences between oral and silent reading.—Schmidt was the first to make an extensive comparison of oral and

silent reading on the basis of eye movement. Each of the eighty-three subjects was examined for both types of reading. As might be expected, oral reading is a slower and more cumbersome process than silent reading. It makes materially heavier demands upon the number and duration of the pauses and upon perception time. In the case of Schmidt's subjects the excess expenditure in oral reading—as compared with the silent—amounted to approximately 25 per cent for both the number and the duration of the pauses and to more than 50 per cent in the case of the perception time.

While these differences are far from negligible they are not as marked as might be expected. The rate of oral reading is severely limited by the physiological mechanism of vocalization—so much so that we can pronounce and enunciate only at a given rate. The rate of silent reading is much less determined. To a certain extent it is of course controlled by inner speech but—as has been repeatedly demonstrated—there are almost no limits to the extent in which this may be abbreviated and reduced. The chief limitation of silent reading is, therefore, found in the reader's capacity to perceive and assimilate. That it is quite possible in actual practice to make marked distinctions between the rates of these two types of reading—the oral and the silent—is shown by the fact that several of Schmidt's subjects read nearly three times as fast silently as orally. That these differences are not more commonly realized is due in large part to the fact that individuals have not been taught to distinguish between oral and silent reading. In fact, most individuals have been trained to read orally rather than

silently. In consequence their silent reading differs from the oral chiefly in that the words are being pronounced silently rather than orally—the play of the speech mechanism being about as marked in one case as in the other.

O'Brien,[1] too, has made a recent and elaborate experimental study of eye movement with reference to improvement in rate in silent reading. He summarizes his results as follows:

> The eye movement records show that the improvement (in rate of silent reading) is effected physiologically chiefly by a lessening of the number of fixations rather than by a shortening of the average duration of the fixations. The improvement is also accompanied by a decrease in the number of regressive movements and by the "setting up" of habits of regular rhythmical eye movements. The pedagogical implication of this finding is that short exposure exercises, in which the amount of material exposed is gradually increased, rather than the amount of exposure being decreased, tend to develop speed in reading. It demonstrates that the directions in the types of training, outlined in this study, to "see more at a glance," etc., are well based. It shows that the development of speed in silent reading is, in reality, reducible to the *more effective utilization of the perceptual span in reading.*

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CHAPTER VII

PERCEPTUAL AND INTERPRETATIVE PROCESSES IN READING

Our discussion of eye movement—especially in so far as it related to the fixation pause—has already thrown considerable light upon the nature of perceptual and interpretative processes in reading. The pause—during which we perceive the materials on the printed page—was found to vary widely with different individuals. Indeed, so striking was this variation that we were led to infer that individuals must be endowed with widely varying perceptual and interpretative capacities. The perceptual span—as indicated by the amount which an individual could perceive on an average during a pause—and the rate of interpretation or assimilation—as shown by the average duration of the pauses—were found to be independent variables coexisting in all possible combinations. Some individuals not only grasp much during a pause but assimilate quickly; others grasp much but assimilate slowly; still others grasp little but assimilate quickly; and finally there are those who not only grasp little but assimilate slowly as well.

However interesting and significant these facts may be, they leave much unanswered. They have nothing to say regarding the relationship between the visual and the perceptual span; they do not explain the manner in which we perceive the units on the printed page—be these

words, phrases, or sentences; nor do they throw much light upon the nature of assimilative and interpretative processes as such. We must make further inquiries, therefore. Fortunately there is again a considerable body of experimental material at our command.

The visual field.—As is commonly known, the structure of the retina is such that the field of clear vision is of necessity limited. In the center we find the *fovea centralis*—a depression approximately one fifth of a millimeter in diameter—which constitutes the area of clearest vision. On the printed page this represents under ordinary reading conditions a distance of approximately four millimeters—the equivalent of three letter spaces. Immediately surrounding the fovea lies the *macula lutea*—a yellow structure representing together with the fovea a horizontal diameter of approximately three millimeters—which constitutes an area of less distinct vision. On the printed page the macula lutea and the fovea cover under normal reading conditions a distance of some sixty-four millimeters—about forty-five letter spaces. Within this area vision decreases rather gradually in clearness as the distance from the fovea increases.

Ruediger's investigation of the visual field.—Ruediger [1] has made the most complete study of the visual field as related to reading. He mapped the field of distinct vision for each of a number of individuals by determining—along various meridians—the distances from a central point at which the letters *n* and *u* could be distinguished. Then he measured the reading rates of these individuals including the number of pauses which they required in

[1] See "Selected References" (12).

reading lines of a given length. Thereupon he compared the extents of the visual fields with the reading rates and the numbers of pauses of these individuals in order that he might determine the relationship between the two.

In general it was found that "the field of distinct vision has no clear-cut boundary line but shades off gradually into indistinct vision"; that "the extent of the field varies with the size, legibility, and distance from the eye of the test units"; that "the shape of the field—bounded by points of equal distinctness—varies in different individuals from a *square-oval*, about twice as long horizontally as wide vertically, to a *circle*"; that "the size of the field varies" with individuals "approximately as 2 to 1 in the horizontal diameter, as 1.5 to 1 in the vertical diameter, and as 2 to 1 in area; and that the extent of the field cannot be appreciably increased through training." It was found, further, that there was no definite relation between the extent of the visual field and reading rate or number of pauses. Ruediger concludes, therefore, "that reading rate is in the main determined centrally by the rapidity with which meaning is aroused after the words are seen"—rather than peripherally by such factors as the extent of the visual field.[1] C. T. Gray—who has more recently made similar tests with a group of children—secured results which are in general agreement with the above, though he found, if anything, a slightly wider span of distinct vision.[2]

The perceptual span.—As will become increasingly evi-

[1] *Field of Distinct Vision*, p. 68.
[2] *Types of Reading Ability*, p. 145.

dent, the visual and the perceptual span do not correspond. In other words, it is one thing to see clearly stimuli extending over a given distance on the printed page and quite another to perceive and interpret them. The latter is a far more complex and variable process. Other things being equal the extent of the perceptual span depends largely upon the individual's ability to group stimuli and to assimilate them in large wholes. All of which means, of course, that it is dependent upon elaborate mental processes. The visual span, on the other hand, is almost entirely conditioned by physiological and mechanical factors.

The perceptual span has been a favored subject for experimental investigation. Most frequently investigations which have concerned themselves with the perceptual span have been carried on by means of some kind of short exposure apparatus—usually the tachistoscope. With this apparatus a variety of stimuli—dots, lines, figures, letters, nonsense syllables, words, and even sentences—are exposed to the reader during very short intervals. In this way it is possible to determine quite accurately the varying amounts of the several kinds of materials which different individuals are able to grasp during given intervals. Although there were earlier experimenters in the field, Cattell was the first to secure thoroughly significant data regarding the span of perception as related to reading. Letters, numbers, words, and sentences were exposed successively during intervals of one one-hundredth of a second. Under these conditions the perceptual span appeared to be limited approximately to four figures or letters, two to four monosyllabic words, and

sentences of from three to seven words. These results brought out in a striking way the effects of possibilities for grouping—the span increasing appreciably with the possibilities for combining letters into words and words into sentences. Somewhat later, Erdmann and Dodge secured results which are in close agreement with the above although the exposure intervals were ten times as long. Their subjects rarely grasped more than four or five isolated letters at one exposure. When the letters were grouped in words four and five times as many were grasped, and when the words appeared in sentences as many as six and seven were perceived at one glance.

Huey also used the tachistoscope in connection with some of his investigations. His procedure differed from the above in that he exposed successive portions of reading material in context rather than in isolation. The horizontal extent of these portions varied from seventeen and one half to forty millimeters. Several individuals were able to read continuously for considerable distances when the extent of the exposures was limited to twenty-five millimeters—about sixteen letter spaces. When the extent was increased to forty millimeters, not any were able to make consistent progress, though exposures of this length were grasped at times.

Quantz attacked the same problem in connection with oral reading by determining how far an individual was able to read after the printed material had been unexpectedly shut off from view. He found that the amount which it was possible to read under these conditions depended to a considerable extent upon the part of the line in which the view was obstructed—the averages for the

beginning, the middle, and the end of the line being 7.4, 5.1, and 3.8 words respectively.

The effect of practice upon the perceptual span.—More recently investigators have been interested in determining the extent to which it is possible to improve the perceptual span through practice. Whipple experimented with both isolated letters and sense materials. In the case of the former—the isolated letters—the effect of practice was negligible. In connection with the latter—the sense materials—practice resulted in rather marked improvement. Whipple attributes this improvement to the fact that sense materials always represent possibilities for grouping—the development of grouping schemes being facilitated by practice. The range of individual variation was, however, so marked that he is inclined to regard the effect of practice negligible when compared with native endowment.

C. T. Gray has recently subjected a number of children to similar practice in connection with sense materials. In the case of two sixth grade boys the effect of practice was negligible. Two fourth grade pupils on the other hand showed rather marked improvement. On the strength of this showing Gray is disposed to conclude that practice should come as early as possible—the use of flash cards in the primary grades being especially commended.[1]

Gray, further, attacked the problem of the relationship between the perceptual span and the rate of reading. He determined the reading rates and the perceptual spans for a considerable number of children—the former by means

[1] *Types of Reading Ability,* pp. 123-146.

of standardized tests and the latter through a short exposure apparatus and the interruption method used by Quantz. A comparison of the two—the reading rates on the one hand and the perceptual spans on the other—showed a rather intimate relationship—the reading rate increasing progressively as the perceptual span widens. This relationship, Gray holds, may be explained in the following manner:

> As the reader looks at a point on the line he sees some elements clearly and some vaguely. The next fixation brings into clear perception elements of the line which a moment before were perceived vaguely. There is an overlapping of spans of attention and the expert reader is able to take advantage more completely than the poor reader of a wide range of experience which lies outside the immediate center of attention.[1]

However that may be, the important facts for us to bear in mind are—first, that there is an intimate relationship between the perceptual span and reading rate; and second, that the perceptual span may be improved through training.

The nature of the perceptual process in reading.—Experimental students of reading have been much concerned with the problem of determining the manner in which the units on the printed page are perceived. Most immediately the issue has centered about the question of the part played by letters in the perception of words. Before the days of extensive experimentation it was generally supposed that the eye passes from letter to letter across the page—each word being as it were spelled out before it is recognized. The investigation of eye movement showed of course that the eye progresses in no

[1] *Types of Reading Ability,* pp. 137–138.

such even manner but rather by leaps and bounds. And what is more, tachistoscopic experimentation showed that not only whole words and phrases but entire sentences—embracing as many as seven words—could be grasped during an interval representing an almost infinitesimal fraction of a second. While such facts shattered the naïve theory of successive letter perception, they did not settle the question of the nature of word perception.

In time two rather widely diverging theories came to be formulated. According to one of these, word perception is mediated by characteristic letters and letter complexes, and, according to the other, words—once we have become familiar with them—are perceived by virtue of their total form—the form of each word being regarded as characteristically different from that of every other word. With certain exceptions German investigators have adhered rather steadily to the former of these hypotheses, while Americans—experimenting both abroad and at home—have generally upheld the latter.

Goldscheider and Mueller's investigation.—Goldscheider and Mueller [1]—who undertook the first of a long series of German investigations—reached conclusions which are more or less neutral as regards these two hypotheses. They admit that total word form tends to play an increasingly important rôle as one's familiarity with words grows. Nevertheless, they contend that word perception is to a considerable extent mediated by characteristic letters—these serving to call up the total word forms. They found in the course of their investigation

[1] See "Selected References" (6).

that there are in most words two kinds of letters—the *indifferent* and the *determining*. The omission of the former did not interfere with tachistoscopic perception since words were readily recognized through the latter. The omission of the latter—the determining letters—on the other hand rendered tachistoscopic perception practically impossible. They conclude, therefore, that determining letters serve as cues to call up total word forms. They were unwilling, however, to classify the letters of the alphabet as *per se* either determining or indifferent, feeling that position within the word had much to do with this—though consonants are more likely to be characteristic than vowels.

Zeitler's investigation.—Zeitler,[1] whose investigation followed upon that of Goldscheider and Mueller, is disposed to regard word form as a negligible factor in word perception. He accepts and elaborates the theory of determining letters and complexes or *dominating parts,* as he calls them. These dominating parts may be letters, combinations of letters, syllables, and in cases where the unit of perception is a phrase or a sentence even short words. These parts alone, he holds, are immediately apperceived—the rest being supplied associatively from within. In the case of units representing several dominating parts the attention is supposed to fluctuate from one part to another until all are grasped. These fluctuations are supposed to follow each other so rapidly that we are quite unaware of them.

Messmer's investigation.—Messmer,[2] who followed

[1] See "Selected References" (16).
[2] See "Selected References" (10).

with another elaborate investigation, accepts in general the theory of successive perception as mediated by dominating parts and the fluctuation of the attention. He is, however, more guarded in his conclusions than Zeitler—in part, perhaps, because he worked with a larger number of individuals. In any event, he groups his readers into two classes—the *subjective,* characterized by a wide and fluctuating span of attention; and the *objective,* characterized by a much narrower and relatively fixed span. The former are strongly influenced by total word form while the latter are generally dependent upon dominating parts. Beyond this, the former—because of their tendency to guess—are subject to considerable error, while the latter—because of their matter of fact disposition—are highly accurate in their perception of visual forms.

In discussing letters Messmer points out that quantitatively each letter has the characteristics of height and breadth and qualitatively those of geometrical form and color. In fact, height and geometrical form largely determine the characteristic form of a word. Accordingly, dominating letters and parts are almost invariably such as project prominently above the line. Finally, Messmer holds that the tendency to perceive words by their total form increases in proportion as the word forms are characteristic and unitary—the objective type of reader being, however, always excluded from such perception.

Cattell's and Erdmann and Dodge's investigations.—As indicated above, American investigators have rather consistently supported the theory that we perceive words—and even larger wholes—by their total form. Cattell,[1]

[1] See "Selected References" (2).

one of the first to carry on extensive investigations in this field, early reached this conclusion—largely because he found that these larger units could be perceived as quickly as single letters. Erdmann and Dodge,[1] whose work followed somewhat later, reached similar conclusions. They found that words were perceived at distances and under conditions which precluded the possibility of letter recognition. What is more, short words were at times recognized even more quickly than single letters and long words required little more time. There was ample evidence, moreover, that those words which have the most characteristic forms are most readily recognized. Finally, these investigators point out that we tend to perceive the objects of everyday experience primarily as wholes—analysis being a secondary factor—and that there is no reason why perception in reading should constitute an exception.

Dearborn's investigation.—Extensive experimentation and a careful examination of the results of German investigators led Dearborn[2] to conclude that the presence of characteristic or dominating letters and letter complexes in no way "lessens the chance of perception of words as wholes." On the contrary these contribute to the characteristic forms of words and so are "made use of as cues in perception." Nor does Dearborn find the slightest evidence of a fluctuation of the attention. Such a fluctuation, he holds, would of necessity be accompanied by motor processes—especially motor processes of the eyes. Accordingly, in order to test the matter thoroughly, Dear-

[1] See "Selected References" (5).
[2] See "Selected References" (4).

born photographed the eyes during tachistoscopic reading. The photographic records which he secured gave no evidence whatever of any movement or unsteadiness on the part of the eyes which could be interpreted as being due to a fluctuation of the attention. He concludes, therefore, that the investigations of Zeitler and Messmer have simply brought out the fact that the span of attention is subject to marked individual variation. In consequence of this, "the subject who can read but small sections may have to combine them in order to obtain wholes," while the subject who is able to seize "the larger sections and whole words has them to start with and so has no need of synthesis." [1]

Huey's investigation.—In making an experimental analysis of total word form Huey [2] found that "the first half of the word is of considerably greater importance for perception than the latter half." The same thing was found to be true of the upper part as compared with the lower. Huey's conclusions regarding the nature of the perceptual process in reading are on the whole very similar to those of Cattell, Erdmann and Dodge, and Dearborn. Although disposed to ascribe a rather prominent place to the part played by characteristic letters and letter complexes, he does not hold that these are perceived as separate units in advance of word form as such. To quote directly:

> However, while the experiments of these investigators indicate the special part which the dominant letters and letter groups play in setting off the word recognition, we need by no means suppose

[1] *Psychology of Reading*, p. 52.
[2] See "Selected References" (8).

that the former are always or usually apperceived as distinct letters in performing their function of special signs. Through their being the most obvious parts optically, and through habit, they have come to be most quickly operative in unlocking the word recognitions; but in ordinary reading they would seem to have but a minimum of attention, performing their function automatically and without any apperceptive act that is distinct from that for the larger whole in which the recognition is subsumed. When that total recognition completes itself, however, we are apt to be conscious of these dominant forms as the most prominent parts of the word.

With some readers, however, and perhaps with all of us for many words, the total form, word length, etc., seem to characterize the word and are apparently the first factors in its recognition. In these cases the stimulations from all the parts and points which signalize this total form are operative simultaneously as cues which set off the projection of this form, and this general outline rather than a few particular dominant letter shapes is the aspect of which we are apt to be most conscious in the total recognition. In such cases the recognition could well be set off by a skeleton drawing of the word showing no particular letter forms, and might well occur at distances at which particular letters were no longer recognizable as such.[1]

Conclusions regarding the nature of the perceptual process in reading.—In general we may conclude, then, that we tend to perceive words and phrases, and at times even sentences, as wholes. However, it must be borne in mind that our discussion has concerned itself largely with developed perception—the assumption being that the reader has not only mastered the mechanics of reading but that he has through repeated experience with words become thoroughly familiar with their form. In the case of words, the pronunciation of which has not been thoroughly mastered or which have not become

[1] *Psychology and Pedagogy of Reading,* pp. 109–110.

familiar through repeated use, recognition by wholes is, of course, out of the question. Such words cannot be recognized until a certain amount of analysis has taken place. As a matter of fact word mastery and reading are two rather distinct processes, so much so, in fact, that they are generally allotted separate practice periods. In consequence the pupil is supposed to be relatively familiar with word forms before he attempts to read. No doubt much drill in rapid word and phrase recognition in the lower grades would materially facilitate early perception by wholes.

The perception of a word or phrase is, as Huey points out, an act—an act not radically different from some gymnastic performance, such as tossing a ball. Performances of this kind become automatic only through practice, and the final execution is likely to be quite different from the initial and intermediary performances—the irrelevant having been eliminated and the essential perfected. So in mastering a word an individual may at first be compelled to examine the form in detail. As time goes on, details are dispensed with more and more, and finally a few characteristics of the word form suffice for recognition. That we during these later stages should reason out as it were the visual form by attending successively or even alternately to the several letters or letter complexes is of course quite out of the question—indeed, quite as much so as is attention to details in connection with a skilled motor performance.

The inner speech in reading.—Any discussion of the perceptual process in reading which fails to take into consideration the function of inner speech must be essen-

tially incomplete. That inner speech plays an important part in reading and in thinking generally becomes obvious once we turn our attention to these processes. And it is quite in accordance with expectation that it should do so. Thinking, speaking, and reading are three forms of language activity—each proceeding in terms of symbols of one kind or other, most commonly the word. When we think, we discuss things with ourselves; when we speak, we discuss things with others; and when we read, we follow the discussion of someone else. In connection with the first two we use the spoken word as a symbol and in connection with the third the written word.

It must be borne in mind, however, that the written word is a mere transcription of the spoken word and that the two are intimately associated. Moreover, most of us think and speak much more than we read so that the spoken word is much more firmly embedded than the written word. It is, therefore, not surprising that the perception of the written word should be accompanied by some degree of articulation and hearing.

The experimental study of the problem.—This problem—like most of the preceding—has been subjected to considerable observation and experimentation. The earliest investigators—Ribot, Bain, Egger, Ballet, Striker, Lotze, and others—were primarily concerned with the extent and the characteristics of inner speech as such. Their method was largely introspective. Their conclusions all pointed in the same general direction; namely, that inner speech not only accompanies but conditions the use of words in thinking and reading. Lotze held that

the same thing was true for music—the recall of tones or series of tones being conditioned and accompanied by an inner singing. However, these early observers stressed the motor rather than the auditory characteristics of inner speech.

A later group of observers—Stumpf, Paulhan, Baldwin, and Collins—questioned the necessity and universality of inner speech. Stumpf and Baldwin both contended that they were able to think of tones quite independently of inner accompaniments. Paulhan took a similar position regarding thinking and reading. Collins' discovery of a case of cortical motor aphasia, in which the inner speech was gone but the patient was still able to read, appeared to lend further support to the position which they were assuming.

Meanwhile Dodge had been making a rather extensive study of his own speech mechanism. He found that inner speech played a very important part in his thinking and reading. However, there was in evidence a decided tendency toward a shortening of the pronunciation and a slurring of the words, especially when he read rapidly. Dodge's general conclusion is that movements of articulation are not an essential factor in inner speech—reproduced movement feelings being sufficient. Bawden at a somewhat later date came to similar conclusions. Huey, on the other hand, is disposed to regard inner speech as a complex involving both motor and auditory elements —one or the other usually predominating. "Sometimes," he states, "when the inner speech was very prominent it was difficult for the reader to say whether it was auditory or motor although it seemed to him to be of but one kind.

The fact is," he continues, "that what we say is always heard as well, and there comes to be an indissoluble union of the auditory and motor elements. Our hearing, too, has an active aspect which may go so far as to include an inner saying, or imitation, of what is heard. And so the auditory and motor types of readers are really apt to be audito-motor types, with one or the other aspect leading in many cases." [1]

Finally, those investigators who have had at their command measuring devices capable of recording articulatory movements have invariably detected the presence of such movements. Curtis not only succeeded in registering the movements of the larynx but he found that these were far more marked when an individual was thinking of something definite or when he was reading silently than when he was thinking of nothing in particular. Courten in recording the movements of the tongue under similar conditions secured practically the same results.

Experiments intended to determine whether inner speech is an essential characteristic or merely a superfluous habit.—The presence of an inner articulation in connection with thinking and silent reading having been rather generally confirmed, investigators set to work to determine whether this constitutes an essential characteristic of these processes or whether it is largely a superfluous habit. They accordingly devised means designed to eliminate such articulation during silent reading. If reading should prove possible under such conditions it would tend to show that articulatory movements were not essential.

[1] *Psychology and Pedagogy of Reading,* p. 120.

Secor's investigation.—Secor[1] was one of the first to attack the problem. He provided for the inhibition of the musculature of articulation by having his subjects whistle or repeat the alphabet aloud while reading silently. One of his subjects appeared to make fair progress under these conditions. Secor next attempted to eliminate the auditory factor—that is the inner hearing—by having a xylophone played near the subject. The reading still continued. Secor concluded, therefore, that "it is possible to read without articulation and audition"—these being considered as aids rather than as necessary elements. However, as Pintner points out, it is highly questionable whether such methods of suppressing audition can be relied upon since inner hearing appears to function in spite of great noise. Also, it is very doubtful whether the repetition of the alphabet suffices to obliterate all articulatory traces.

Pintner's investigation.—Pintner[2] more recently attacked the same problem. He limited himself to a quantitative study of reading under conditions in which articulation was excluded—no attempt being made to inhibit audition. His subjects read selected prose passages silently while repeating aloud the numbers 13, 14, 15, 16. Pintner feels that the possibilities for word articulation were shut out in this way. He does not contend, however, that it is possible to eliminate all traces and vestiges of articulation. Indeed, he holds that these may be present in spite of all introspective evidence to the contrary. After a certain amount of practice his subjects were able to read

[1] See "Selected References" (14).
[2] See "Selected References" (11).

as rapidly and effectively without articulation as under normal conditions, and although both subjects returned to articulation after the removal of the restrictions, they showed a decided improvement in their rate of reading, and both felt that the amount of articulation had been permanently reduced. Pintner concludes, therefore, that articulation is a habit which is not essential in connection with reading; that "practice in reading without articulation can make such reading as good as the ordinary reading; and that such practice "tends to aid ordinary reading, most probably by shortening the habitual practice of articulation." [1]

The significance of Pintner's results.—The chief significance of Pintner's results lies doubtless in the fact that they establish the possibility of improving the rate of silent reading through a reduction of articulation. That an increase in the rate of reading is accompanied by an abbreviation and a slurring of inner speech has of course been repeatedly pointed out by such investigators as Huey and Dodge. Indeed, if it were not for the possibility of such curtailment, improvement in the rate of silent reading would be almost as severely limited as is improvement in the rate of oral reading. Whether a direct attack upon the problem of reduction—such as that suggested by Pintner's procedure—would prove practicable remains to be determined. The results of C. T. Gray's recent experiment point in this direction. A number of children—children who showed a marked degree of vocalization—were subjected to a period of training for reduction. The procedure was very simple, the subjects

[1] *Inner Speech during Silent Reading,* pp. 152–153.

being simply told to read in their natural manner but without vocalization. The practice resulted in a marked decrease in articulation and in a general increase in the rate of reading. In connection with most selections there was, however,—under these conditions—in evidence a loss in comprehension. Whether this could have been overcome through further practice is not known. "It is possible," as Gray suggests, "that the mental activity of children proceeds in a large measure in terms of vocal reactions and that the process of abridging these reactions must be a slow and gradual process." [1]

O'Brien's Investigation.—As a result of recent extensive experimentation in "training to decrease vocalization," O'Brien [2] reached the following conclusion:

> Investigation showed, however, that the effort to lessen inner articulation was far more successful when the individual not only consciously endeavored to inhibit such movements but also read rapidly at the same time. The comfortable, leisurely rate of reading to which the average individual is accustomed seems particularly favorable to the arousal of the usual articulatory movements.
>
> It was found that when to the conscious attempt at inhibition was joined rapid reading, the decrease of inner articulation was effected more promptly and more thoroughly. Apparently, these two factors are so closely interrelated that a mutual casual relationship exists between them. The exclusion of rapid reading from the training to decrease vocalization would have deprived the latter of one of its most effective aids.

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[1] *Types of Reading Ability,* pp. 162–164.
[2] See "Selected References" (17).

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CHAPTER VIII

READING ABILITY—ITS DEVELOPMENT AND VARIATION

Reading ability—like most other forms of human behavior—is a variable. It is profoundly affected by differences in individual capacities and it varies in some respects with age and training. The latter—variation with age and training—has as far as we know never been denied—even in the days antedating the scientific study of the reading process. Individual differences on the other hand received little recognition until quantitative studies demonstrated their prevalence and emphasized their significance. Such variations as were in evidence among a group of individuals were not uncommonly attributed to differences in application and training. We shall review briefly some of the quantitative studies upon which our knowledge of the development and variation of reading ability is so largely dependent.

Early studies of rate and comprehension.—The earliest studies of reading ability were largely concerned with the rate and comprehension of adult reading. One of the first studies is recorded by Romanes.[1] Incidentally—while engaged in major investigations in another field—he measured the reading ability of a number of his subjects by determining the proportion of a simple para-

[1] See "Selected References" (13).

graph which each was able to read during an interval of twenty seconds and the amount reproduced immediately after. The results showed "astonishing differences in the maximum rate of reading which is possible to different individuals all of whom have been accustomed to extensive reading"—some individuals reading four times as much as others. Furthermore, slow reading was not conducive to excellence in comprehension. "On the contrary, when all the efforts" were "directed to assimilating as much as possible, the rapid reader usually gave a better account of the portion of the paragraph which" had "been compassed by the slow readers than the latter" were "able to give and the most rapid reader" was "also the best at assimilating." The only consolation for the slow reader appeared in the fact that there was no evidence of a direct relationship between reading ability—as thus determined—and general intellectual capacity. Several of the slow readers were "highly distinguished men in science and literature." [1]

More than a decade later Miss Abell [2] undertook an investigation at Wellesley College. Forty-one girls were asked to read a certain selection at home and to note the time required for the reading. At the next class period—without having been told so in advance—they were requested to reproduce the content as nearly verbatim as possible. The results showed great individual variation in both speed and comprehension. The most rapid reader read more than six times as fast as the slowest. There was in evidence no very direct relationship between rate

[1] *Mental Evolution in Animals,* pp. 136–137.

[2] See "Selected References" (1).

of reading and comprehension, and yet two of the most rapid readers also ranked highest in comprehension.

Somewhat later Quantz[1] experimented with fifty juniors and seniors at the University of Wisconsin. When reading silently his subjects averaged at their normal rate from 3.5 to 8.8 words per second and at their maximum rate from 3.5 to 12.2 words per second. For oral reading at the ordinary rate the averages ranged from 2.6 to 2.9 words per second. Quantz found further that rapid readers generally surpassed the slow in comprehension—the differences amounting on an average to about 37 per cent.

Huey gives the results for twenty graduate students whose reading rates he investigated:

> The reading was from an interesting novel, presenting no special difficulty, and the tests were made under conditions which approximated as nearly as possible those of comfortable reading in one's own quiet room. The readers were found to range in rate from an average of 2.5 words per second for the slowest reader to an average of 9.8 words for the fastest, when reading silently at their ordinary rate. When the silent reading was at a maximal speed, the rates ranged from 3.5 to 13.5 words per second. In reading aloud, the average of the slowest reader was 2.2 words per second and that of the fastest 4.7, at the ordinary rate, and at maximal speed the corresponding range was from 2.9 to 6.4 words per second. The average rate of the twenty students when reading silently was 5.63 words per second at their ordinary speed and 8.21 at their maximal, while in reading aloud they averaged 3.55 words per second at their ordinary speed and 4.58 at their maximal. Several of the readers averaged near the fastest rates given above, and the other readers were distributed somewhat evenly, as to rate, from the fastest rate to one somewhat above the slowest.[2]

[1] See "Selected References" (12).

[2] *Psychology and Pedagogy of Reading*, pp. 174–175.

On the strength of observations in connection with this and other investigations Huey expresses the belief that one's habitual rate of reading may be materially improved through judicious practice.

Dearborn[1] also investigated the reading rate of a number of individuals. He selected the fastest and the slowest readers from a group of thirty people and found that the former read on an average three times as fast as the latter. Like Huey he believes that the rate of reading may in the case of most individuals be improved through consistent practice.

Recent investigations of rate and comprehension.—The earlier investigations—while demonstrating in a very forceful manner the existence of marked individual variation in adult reading ability—threw practically no light upon the most crucial problem from the standpoint of educational psychology; namely, the development and variation of reading ability in the case of children. During the early part of the present decade, however, investigators began to turn their attention toward this problem. The investigations of this period were still largely concerned with rate and comprehension but there is in evidence a decided shift in emphasis—the investigator concerning himself primarily with the manner in which these factors vary with age and training.

Waldo's investigation.—Waldo[2] reports one of the earliest investigations which concerned itself with the reading ability of a considerable number of children. Although he was primarily interested in determining the effect of practice upon reading ability, his results throw

[1] See "Selected References" (3). [2] See "Selected References" (15).

considerable light upon the development and variation of reading ability from grade to grade. The investigation was concerned with children from the third to the eighth grades inclusive. Two tests were given—one in September and the other in March—the children being subjected to directed training during the intervening period. Since scientifically graded reading selections were not available at that time, Waldo confined himself to two sets of materials—one for grades three to five and the other for grades five to eight. The reading was silent and extended over a period of five minutes. Comprehension tests were given immediately after. In terms of the average number of words read per second, the results for the several grades were as follows:

GRADE	SEPTEMBER TEST	MARCH TEST
III	1.27 words	2.46 words
IV	1.54 "	2.72 "
V	1.88 "	2.15 "
VI	2.10 "	2.16 "
VII	2.04 "	2.38 "
VIII	2.45 "	2.64 "

In spite of the absence of standardized reading selections, these averages bring out interesting group tendencies. In the case of the September test there is, as Waldo points out, little improvement in the rate of reading beyond the fifth grade—although the eighth grade is somewhat superior to the sixth and seventh; the March scores show that third and fourth grade pupils can read about as rapidly as seventh and eighth grade pupils, provided they have received proper training. An examination of the individual scores shows a tremendous variation

among the pupils of the several grades. Thus the averages for the third grade range from 1.18 to 3.94 words per second; those of the fourth from 0.37 to 5.78; those of the fifth from 0.78 to 5.01; those of the sixth from 0.62 to 3.68; those of the seventh from 0.78 to 4.55; and those of the eighth from 0.78 to 5.73. Because of such variation—as Waldo points out—many pupils of the lower grades surpass in reading ability a considerable proportion of the pupils in the upper grades. In this case 29.5 per cent of the pupils in the fifth grade read more rapidly than did the average of the eighth grade; 36.1 per cent read more rapidly than did the average of the seventh grade; and 46.6 per cent read more rapidly than did the average of the sixth grade.

Oberholtzer's investigation.—Oberholtzer[1] measured the reading ability of a large number of children at Tulsa, Oklahoma. The reading materials were selected from readers intended for the different grades. The scores for approximately 1000 of the children tested—in terms of the average number of words read per second—are:

GRADE	SILENT READING	ORAL READING
III	2.3 words	2.1 words
IV	2.6 "	2.3 "
V	3.1 "	2.4 "
VI	3.9 "	2.8 "
VII	4.7 "	3.1 "
VIII	4.8 "	3.9 "

Oberholtzer concludes on the strength of these scores that the rate of reading tends to increase rather gradually from grade to grade. The scores for comprehension show

[1] See "Selected References" (11).

much the same tendency. On the whole there was in evidence a rather direct relationship between rate of reading and comprehension—the rapid reader being distinctly superior in his grasp of content.

Courtis's investigation.—Courtis[1] measured the reading ability of several thousand children and a number of adults by means of his Standard Tests in English. He distinguishes between *normal* and *careful* silent reading. In the case of the former the children read the real continuation of a story—a continuation which was of interest to them, because they had just attempted to compose it themselves. Immediately after the reading—without having been told so in advance—they were given a comprehension test which measured their ability to remember whether or not certain words had occurred in the selection. In connection with the latter—the *careful* reading—the children read a third part of the same story, with the knowledge this time that they would be called upon to reproduce what they had read. On the strength of the results which he obtained, Courtis submitted the following standard scores—expressed in terms of the median number of words read per second—for the several grades and the two types of reading:

GRADE	NORMAL READING	CAREFUL READING
IV	2.6 words	1.7 words
V	3.0 "	2.2 "
VI	3.7 "	2.9 "
VII	4.2 "	3.0 "
VIII	4.3 "	3.3 "
Adults	5.3 "	3.0 "

[1] See "Selected References" (2).

He points out that the two types of reading evidently follow different laws of development—the rate of the former improving rather gradually from grade to grade and even through the high school years while that of the latter shows little improvement beyond the sixth grade. Like all previous investigators, Courtis calls attention to the tremendous range of individual variation which was in evidence among his readers.

The Courtis tests for *careful* silent reading were later given to approximately 1600 pupils—distributed through grades five to eight inclusive—in the Salt Lake City schools. The scores for rate and comprehension—the former expressed in terms of the median number of words read per second and the latter in terms of the percentage of points correctly reproduced—were as follows:

GRADE	RATE	COMPREHENSION
V	3.18 words	74.0 per cent
VI	3.53 "	77.1 " "
VII	3.65 "	72.8 " "
VIII	3.48 "	79.3 " "

It will be observed that these scores add further confirmation to Courtis's position that the rate of *careful* reading does not increase appreciably beyond the sixth grade. The four grades read at nearly the same rate, and their comprehension scores vary but little. The range of individual variation was, however, very marked. In a typical fifth grade class the rates varied from 1.33 to 6.33 words per second; in the sixth and seventh grades the ranges extended from 1.00 to 6.33 words per second;

and in the eighth it extended from 1.66 to 6.33 words per second.

Starch's standard scores.—Starch [1] measured the silent reading ability of 3511 pupils and thereupon computed standard scores of efficiency in rate and comprehension. The selections which were read by the pupils were chosen from graded readers. Comprehension was measured by having pupils reproduce as nearly verbatim as possible what they had read. The standard rate scores and the standard comprehension scores—the former expressed in terms of the average number of words that were read per second and the latter expressed in terms of the average number of words that were correctly reproduced—are as follows:

GRADE	RATE	COMPREHENSION
I	1.5 words	15 points
II	1.8 "	20 "
III	2.1 "	24 "
IV	2.4 "	28 "
V	2.8 "	33 "
VI	3.2 "	38 "
VII	3.6 "	45 "
VIII	4.0 "	50 "

It will be observed that these scores represent a progressive improvement from grade to grade in both rate and comprehension. The range of individual variation was very striking—so much so that the slowest and the most rapid readers were distributed over all the grades —with the possible exception of the first and second.

[1] See "Selected References" (14).

Scores obtained through Kansas Silent Reading Tests.—Monroe reports the results of 100,000 children—distributed over one hundred and sixty cities—whose reading ability was measured by means of the Kansas Silent Reading Tests. In these tests rate and comprehension are expressed in a single score. The median scores are as follows:

GRADE	SCORE
III	5.3
IV	9.5
V	13.2
VI	13.9
VII	16.2
VIII	19.2
IX	22.9
X	25.6
XI	26.5
XII	29.7

Monroe attributes the rather progressive improvement from grade to grade to the fact that these tests measure comprehension rather than rate of reading.

Monroe's standard scores.—Elsewhere Monroe[1] presents standard scores which he computed after measuring the reading ability of more than 30,000 children by means of his own standardized silent reading tests. In these tests rate and comprehension are represented by separate scores—scores which are, however, little more than ratios since they do not directly represent the amount read per unit of time or the actual percentages of materials or points reproduced. The scores are as follows:

[1] See "Selected References" (10).

GRADE	RATE	COMPREHENSION
III	57	8.7
IV	83	15.0
V	91	20.0
VI	96	21.0
VII	98	25.0
VIII	108	28.0
IX	87	22.0
X	81	25.0
XI	88	26.4
XII	89	27.0

It will be observed that there is practically no improvement in rate beyond the sixth grade.

McLeod's investigation.—An investigation undertaken by McLeod [1]—primarily for the purpose of determining "the influence of increasing difficulty of reading material upon rate, errors, and comprehension in oral reading"—throws considerable light upon the development of oral reading ability. In all 238 pupils, distributed through grades one to eight inclusive, were tested. Gray's Standard Oral Reading Test was used. Comprehension was measured by means of questions. McLeod found that there was a very rapid increase in the rate of oral reading during the first two grades—the growth from that point on being more gradual. Grades three to five read at a fairly uniform rate, as did also grades six to eight. The difference in the accomplishments of these two groups did not exceed one-half word per second. McLeod explains these developmental periods on the basis of the status of word recognition. He says:

> In the first two grades the child is learning to recognize the symbols for words which are already a part of his spoken vocabulary.

[1] See "Selected References" (9).

His rate of reading in this period improves rapidly for he has but the one task of associating printed symbols with familiar word sounds. In the third grade his reading vocabulary probably overtakes his spoken vocabulary, and the additional struggle with meanings interferes with the automatizing of the process of word recognition and so holds up for a time further increase in the rate. This task of acquiring meanings is prominent also during the fourth and fifth grades. The situation is further complicated by the fact that the pupil of these grades is being called upon to form his habits of silent reading in order to meet the requirements of his other studies. The scattering of interests in this way undoubtedly causes a break in the formation of habits in oral reading. As the pupil becomes acquainted with more and more words and their meanings, and the habit of silent reading becomes more or less fixed, opportunity is given for another increase in the rate of oral reading. This increase we find in the sixth grade. After the increase at that time, the training of the school and the physiological limitations of the organs of speech prevent further large increases for material which is read with ease. For such material the pupils of these grades approximate their adult rate.

W. S. Gray's investigations.—W. S. Gray [1] has made a number of elaborate investigations of reading ability—both oral and silent. Several thousand children were examined while his standard tests for oral and silent reading were being developed. More recently additional thousands have been tested—for the most part in connection with school surveys. In the case of oral reading only rate and accuracy—accuracy in word recognition and pronunciation—have been measured, the results being expressed in one score. In the case of silent reading, rate and comprehension have been measured—the rate score being expressed in terms of the average number of words read per second, and the comprehension score in terms of the

[1] See "Selected References" (5).

pupil's average attainment in connection with two tests for comprehension.

Gray's scores are usually represented in graphic form. Chart I shows the average oral reading scores for sev-

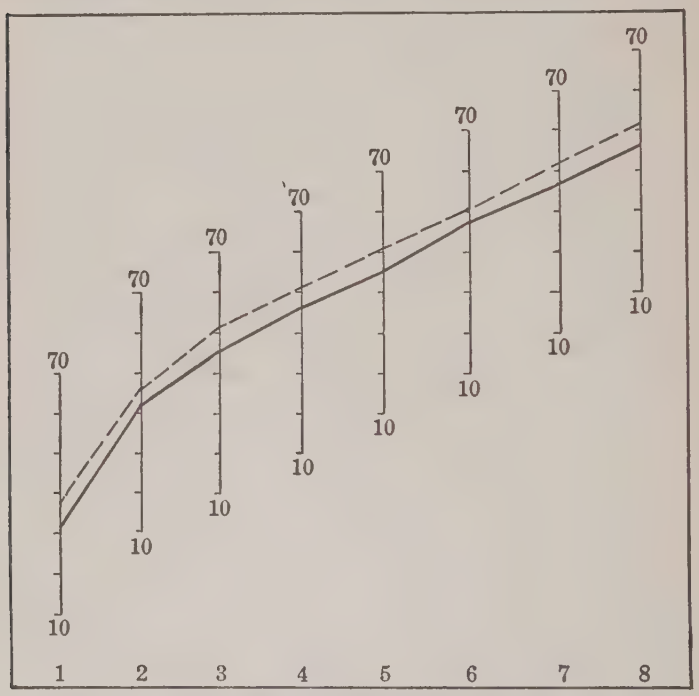

CHART I. AVERAGE ORAL READING SCORES FOR 10,526 ST. LOUIS PUPILS AND FOR 2193 CLEVELAND PUPILS

eral large city school systems. The relative positions of the vertical lines—one for each grade—represent the levels of expectation for the several grades, more being expected of each successive grade. The reading scores—

as determined by the test—are indicated by the points at which the curves intercept these lines. It will be observed that oral reading ability improves rather rapidly during the first two or three grades and thereafter much more gradually. The results of another investigation—reported by Gray—indicate that the high school and college periods are characterized by the same gradual improvement as the middle and upper grades in the elementary school. In discussing these tendencies, Gray says:

> It is in harmony with natural expectation that the first two or three years of school work should be characterized by rapid growth in reading ability. The pupil at this time is devoting a great deal of his attention to the acquisition of reading habits. Every lesson brings the pupil in contact with new words, and he has abundant opportunity to associate the sight symbols with their proper pronunciation. The words which are learned at this time are usually within the comprehension of the pupil, and word mastery can progress rapidly, uncomplicated by the problem of mastering meanings. Furthermore, the power of word analysis develops so rapidly during the second and third grades that the pupil is able to pronounce at sight most of the common words by the beginning of the fourth grade.
>
> During the fourth, fifth, and sixth grades silent reading becomes the dominant type of reading. Ability to read is now measured largely in terms of a pupil's ability to master the thought of what he reads. The pronunciation of a large proportion of the words is more or less familiar. Hence the opportunities for increase in oral reading ability are much fewer than during the preceding period, and we should naturally expect progress to be less marked. On the other hand, there are factors operating which tend to increase the pupil's ability in oral reading. The subject matter which is read brings the pupil daily into new fields of thought and in contact with some new words. In order to use these words in class discussion or even in oral reading, the pupil is constantly analyzing words or looking up their pronunciation in the dictionary. Furthermore, the pronunciation of partly familiar words becomes more rapid and accurate and the words of a selection are

grouped together more economically and effectively. All of these factors result in regular progress in oral reading during the intermediate grades, although the rate of progress is less rapid than in the lower grades.

By the time a student reaches the high school period his reading habits are definitely established. The subject matter studied at this time repeats for the most part the reading vocabulary which the pupil has already mastered. Technical terms peculiar to certain subjects, proper names, foreign derivatives, etc., are encountered, however, from time to time, and the pupil is forced to continue his study of words. Hence, there is some progress from year to year through the high school and college period, measured largely by the scope of the student's general reading and by the character of his specialized work.[1]

Chart II shows the silent reading scores for several large city school systems. Since the silent reading test consists of three selections, "adapted respectively to the interests and reading capacity of second and third grade pupils; fourth, fifth, and sixth grade pupils; and seventh and eighth grade pupils"—three corresponding ordinates are used in plotting the curves. For the second and third grades the curves are, therefore, to be interpreted in terms of the figures at the left of the diagram; for grades four to six inclusive in terms of those on the dotted line on the left; and for the seventh and eighth grades in terms of those on the dotted line on the right. In this way the curves bring out very clearly the development of rate in silent reading from grade to grade. It will be observed that progress is most rapid during the first four or five grades, and that it is negligible beyond the sixth grade. Another investigation in which the reading ability of high school and college students was measured shows that there is but slight improvement in the rate of silent read-

[1] *Studies of Elementary School Reading,* pp. 143-144.

ing during the high school and college periods. Gray again feels that these tendencies—especially in so far as they concern the elementary and intermediate grades—are in accordance with natural expectations. During the second and third grades progress is rapid because the "pupil is developing rapidly in his ability to recognize

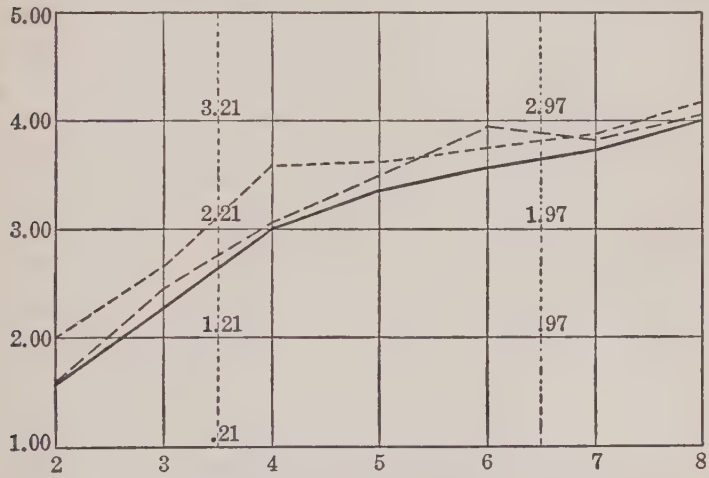

CHART II. RATES IN SILENT READING FOR 8928 ST. LOUIS PUPILS, FOR 1831 CLEVELAND PUPILS, AND FOR 2654 PUPILS OF 13 OTHER CITIES

words at sight. As the ability to recognize words increases the power to recognize larger and larger units at a single fixation of the eye develops, with the result that during the intermediate grades the eye moves along the lines at a constantly increasing rate," so much so, that "the maximum development for careful reading is approximated in the sixth grade." [1]

[1] *Op. cit.*, p. 145.

Chart III shows the scores for comprehension or quality in silent reading. In general these curves indicate that ability in comprehension develops far more gradually through the grades than does rate. As Gray points out, improvement is very rapid during the second grade; dur-

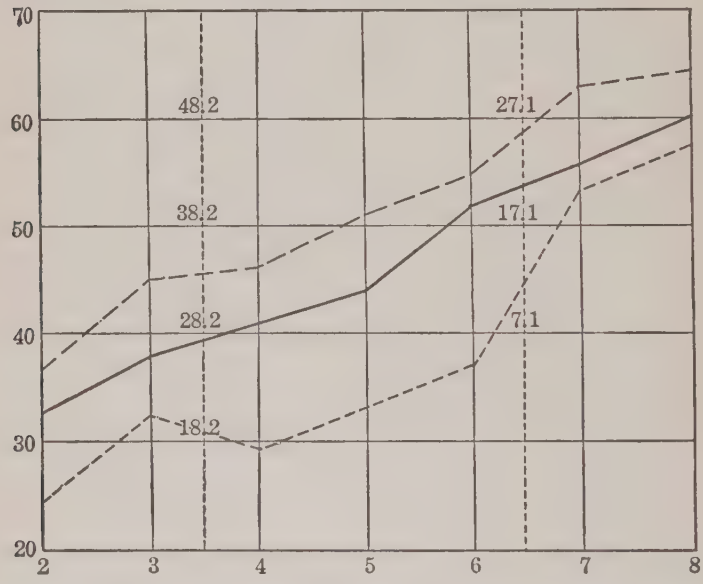

CHART III. AVERAGE QUALITY SCORES IN SILENT READING FOR 8928 ST. LOUIS PUPILS, FOR 1831 CLEVELAND PUPILS, AND FOR 2654 PUPILS OF 13 OTHER CITIES

ing the third and fourth it is somewhat less marked; and from that point on there is continuous improvement even through the high school period as shown by other studies. "The rapid improvement in the quality of silent reading at the beginning may be explained in part by the

fact that the pupil improves rapidly in his ability to use reading as a tool for thought. Habits of attention and study are being developed and refined. The pupil's fund of experience is being rapidly enlarged, with the result that he is able to comprehend the meaning of what he reads more adequately." Certain irregularities in the quality curves—the uncertain progress during the second and third grades for example—Gray feels, may be "explained in part on the basis of the relative emphasis which is given to speed and quality,"—one being stressed to the exclusion of the other. During the fourth, fifth, sixth, and seventh grades progress in comprehension is to be expected. "It is just at this time that the pupil learns to use reading in a large way as a tool to enlarge his world of meanings. He reads copiously and with purpose. The natural result should be increased power in getting the thought of the printed page. As the pupil continues through the grammar grades and in the high school, his methods of study are improved," and in consequence the power of comprehension continues to grow.[1]

Like other investigators, Gray found marked individual variation in reading ability. In Cleveland, for example, "in many third grade classes pupils were tested who ranged in ability from those unable to read as well as an average first grade pupil to those able to surpass an average eighth grade pupil. In the intermediate and upper grades there were a number of pupils who were still unable to pronounce at sight some of the simpler words, and they ranked no higher in achievement than average first or second grade pupils. In each of the grades above

[1] *Studies of Elementary School Reading,* pp. 146-147.

the second there were many pupils who made a very high score and for whom it is doubtful whether continued daily drill in oral reading is longer necessary." [1]

Beyond this, reading achievement was found to vary widely from school to school within given school systems. In the case of Cleveland special analyses and comparisons were made to determine the extent to which reading efficiency might be influenced by such factors as nationality, sex, and methods of teaching beginning reading. Nationality was found to exert some influence during the first three grades—children of American parents excelling all but Jewish children up to that point. In the sex comparisons the girls were found to be slightly superior. A comparison of the reading achievement of pupils taught by the Ward and the Aldine methods respectively brought to light no important differences.

In order to throw more light upon the relation between reading rate and comprehension in silent reading, Gray made several analyses. In the first place the rate scores for each grade were divided into three equal divisions—rapid, medium, and slow. The comprehension scores were divided in similar fashion into poor, medium, and good. The individual records of 1831 Cleveland pupils were then compared as to their respective ranks for rate and comprehension—each reader necessarily falling into one of nine classes. The percentages of individuals falling into the several classes were as follows: rapid rate and good comprehension, 14; rapid rate and medium comprehension, 11; rapid rate and poor comprehension, 8; medium rate and good comprehension, 12; medium rate and

[1] *Studies of Elementary School Reading,* pp. 123-124.

medium comprehension, 11; medium rate and poor comprehension, 10; slow rate and good comprehension, 8; slow rate and medium comprehension, 11; and slow rate and poor comprehension, 15.

This distribution, Gray points out, emphasizes the fact that "good readers are usually not slow and poor readers are usually not fast." However, "it is evidently not safe to lay down any absolute rule. The average teacher is confronted with pupils who might fall in any one or all of the nine classes mentioned. There are good readers who are rapid and there are good readers who are slow. There are rapid readers who retain much of what they read and there are rapid readers who retain little. The points of greatest significance revealed by the table are the facts that high rate and good quality are more commonly related than rapid rate and poor quality." [1]

King's investigations.—King [2] has recently made several investigations, the chief aim of which was to determine the relationship between rate and comprehension in silent reading. The subjects examined were college students and the materials read were expository selections from a current periodical. In connection with the first investigation ninety-three individuals read a given selection—all being "requested to stop after five or six of the fastest readers had finished." The results showed a wide difference in the rates of reading—some reading five columns in the time that others read the entire article of twelve columns." An analysis of the relationship between rate and comprehension showed that "the fastest twenty-

[1] *Op. cit.*, p. 134.
[2] See "Selected References" (8).

five per cent of the entire group of ninety-three had a percentage of accuracy"—in comprehension—"of 50.2 per cent; the slowest twenty-five per cent had a percentage of accuracy of 48 per cent; the middle fifty per cent—those who read at a medium rate—had a percentage of accuracy of 46.5 per cent." In discussing these results, King points out that there appears to be "little if any difference in reading efficiency if subjects read at their normal rate. The fastest readers have the advantage of covering more ground—nearly twice as much—and of having gained more points absolutely than the slow and the quality of their reading is slightly better than that of the slowest group." [1]

The results of two investigations carried on somewhat later under similar conditions except that the exactions for comprehension were somewhat more severe—favor the slow reader. In the first, "the lowest fourth in speed had an average percentage of accuracy of 67 and a median of 71. The fastest fourth of the readers attained an average accuracy of 60 and a median of 61. The second quarter in speed had an average accuracy of 54, and the third quarter"—the one next to the lowest in speed—"averaged 64 in accuracy." The coefficient of correlation—between rate and comprehension—computed by the Pearson formula adapted to rank-differences was 27. In the second of these investigations—in which practically the same group of students participated—"the average percentage of accuracy of the fastest quartile was 41.8" and that of the lowest 53. The coefficient of correlation—computed as before—was 47. King concludes that in "this

[1] *School and Society,* IV: 830–834.

sort of tests the rapid reader is considerably less efficient" in comprehension than the slow.[2]

Summary.—Having reviewed some of the most important investigations of reading ability, we may briefly summarize their bearings upon such problems as individual variation, the development of rate in oral reading and in silent reading, the development of comprehension, and the relationship between rate and comprehension.

Individual variation.—All investigators point to marked individual variation—so much so in fact, that there can be no doubt regarding its universality. Furthermore, the fact that this variation asserts itself so persistently—under systems of instruction varying widely in efficiency—shows that we are face to face with a given phenomenon—one largely determined by native capacity. This creates no end of problems for the school. And the situation is of course aggravated by the fact that similar variations are in evidence in connection with practically all other forms of human behavior. The new science of educational psychology has demonstrated this very clearly during recent years. With all this, the rigidity of our graded lock-step system continues much as formerly—especially in the first six years of the child's school life. In consequence large groups of children whose reading abilities vary widely continue to receive identical instruction—a type of instruction which benefits probably little more than half of the group since it is too advanced for some and too elementary for others. It is scarcely necessary to point out that such practices

[1] *School and Society,* VI: 203–204.

would lead to bankruptcy in the world of practical business affairs.

Certain adjustments are, therefore, inevitable. Within reasonable limits the iron-bound requirements of group instruction must be abandoned. We must see to it that pupils of exceptional ability will no longer be compelled to waste their time with group exercises which they have long since mastered. In addition, pupils who are not making satisfactory progress in reading must be subjected to clinical examination in order that their peculiar difficulties may be discovered and the character of subsequent instruction adapted to their needs.

The development of rate in oral reading.—The results regarding the development of rate in oral reading are in general agreement. Improvement of rate of oral reading may be characterized as very rapid during the first two or three grades, somewhat more gradual during the next two or three, and relatively slight thereafter—practically no progress being in evidence during the high school and college periods. From the standpoint of instruction this means of course that the lower grades constitute the optimal period for the teaching of oral reading.

The development of rate in silent reading.—Two tendencies are in evidence in the development of rate in silent reading. In some cases there appears to be a gradual and progressive improvement in rate through the elementary and high school grades—and in some instances possibly beyond that. In other cases there is rapid improvement in rate during the first five or six grades and little thereafter.

Gradual improvement in rate appears to be characteristic of the so-called *normal* silent reading—reading in which the individual is not held strictly accountable for the content although he is to all intents and purposes following the thought of the author. Much of our reading—especially recreational reading—is of this care free type. We read narratives, descriptions, expositions, and even arguments rapidly and often with so much appreciation that an observer would have little difficulty in divining the nature of the content from our facial expression, and yet, if we were to be interrupted a moment later, the chances are that we could give but little account of the details which impressed us so only a moment ago. Such reading implies a wide grasp and a high degree of general intelligence, and it is only natural that it should develop gradually with growing experience and increasing maturity.

Rapid improvement during the first five or six grades—with little change thereafter—appears to be characteristic of the so-called *careful* reading—reading in which the individual is held responsible for much of the content. Such reading makes material demands upon memory. Its scope—as far as rate is concerned—is, therefore, confined within relatively narrow limits—limits which may be reached early in the pupil's career. Beyond this there is of course continued improvement in the individual's ability to deal with increasingly complex materials, even though there is little change in rate. The results of most investigations point to the fifth or sixth grades as the periods at which children tend to approximate their maximum ability in the rate of *careful* silent reading.

This is probably true under existing methods of teaching reading. The writer is disposed to believe, however, that a maximum rate may be approximated during the third and fourth grades,—assuming of course that the reading materials fall within the comprehension of the individual, and that training in silent reading has been stressed. While the first three grades constitute the optimal period for the teaching of oral reading, there is no reason why silent reading should be neglected. On the contrary—as we shall point out later—there are excellent reasons why it should receive much attention during this period.

The development of comprehension.—The results of investigations uniformly point toward a gradual development of ability in comprehension. During the first two grades progress appears to be rapid—fully as rapid as progress in rate. This—as Gray points out—is easily explained by the fact that the pupil encounters "few words the meanings of which are not already familiar to him because of their frequent use in everyday conversation." During the next two grades there is much less progress. In fact, in some cases there may be actual loss in efficiency. Again Gray's explanation is pertinent. He points out that the pupil meets in these grades many words with the meanings of which he is not familiar. In consequence improvement in ability to get meanings does not keep pace with progress in word recognition. During the succeeding grades and the high school period —and probably beyond that—there appears to be a progressive and continuous improvement in comprehension. That the development of ability to get meanings should

be closely correlated with increasing experience and growth in maturity is to be expected.

Relation between rate and comprehension.—Most of the earlier investigators were led to believe that the rapid reader tends to surpass the slow in comprehension. The reading was in those cases for the most part at the individual's own natural rate and the subject matter relatively simple. The results of more recent investigations have by no means overthrown this hypothesis. They have shown, however, that the relationship between rate and comprehension is complex, and that it may vary with conditions. Under ordinary conditions when the subject matter is not too complex and the demands upon comprehension not too exacting, the advantage is clearly with the rapid reader—though perhaps not always with the most rapid—and all this notwithstanding the fact that the rapid reader covers much more ground than the slow. When the reading materials are complex and the demands upon comprehension exacting—conditions which resemble study—the rapid reader may be somewhat less accurate, as indicated by King's results. The results of some of the investigations indicate, further, that the habitual rate of reading may in many cases be increased materially without lessening comprehension. Just how far this may be done remains to be determined experimentally.

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CHAPTER IX

ORAL AND SILENT READING—A COMPARISON

Oral reading and tradition.—Oral reading instruction has long received undue attention in our schools. Training for effective silent reading on the other hand has been neglected—and this, in spite of the fact that we read for the most part silently for the purpose of getting the thought of the printed page. In general, this lack of correspondence between the aims of teaching reading and the needs of everyday life is a good example of the oft repeated failure on the part of the school to adapt itself to changing conditions.

There was a time when oral reading—like the lecture platform—played a more important rôle in life. Indeed, the farther back we go in point of time the more obvious this fact becomes. Not only do books become scarcer and scarcer, but those who are able to read grow fewer and fewer. Under such conditions oral reading ability was in the very nature of the case at a premium—meeting, as it did, a vital need in the life of the times. However, with the passing of time conditions have changed. The gradual spread of universal and compulsory education has reduced illiteracy to a minimum and has created countless new interests. The press, because of its marvelous development and perfection—reënforced

in turn by the spread of libraries—has placed at our disposal such a wealth of reading material that even the masses may to-day read to their hearts' content. And for the most part the exigencies of the situation demand rapid silent reading.

Objective character of oral reading.—In part the long continued popularity of oral reading instruction must be attributed to the fact that it is without question a far more objective form of behavior than silent reading. Teachers have found it a relatively simple matter to check and evaluate its quality—at least as far as pronunciation and expression go—certainly much more so than in the case of silent reading. For the primary grades this objective character is obviously of very great importance. In fact if word mastery is to be properly directed, oral reading must of necessity occupy an important place in these grades. By the close of this period, however, pupils should be practically autonomous in the matter of word mastery. Thereafter the chief aim of reading instruction is to develop efficiency in thought getting. This—it must be borne in mind—may be accomplished most effectively through training in silent reading.

Oral reading and training in expression.—In many cases oral reading instruction has been—and still is—justified on the assumption that it would afford valuable training in oral expression. That there is need of such training is obvious. Oral communication plays too important a part in human life, and its improvement is too dependent upon directed practice to be neglected by the school. That oral reading exercises—as ordinarily conducted—contribute much to training in expression may

well be questioned. That they might be utilized for this purpose to some extent—through a modified procedure—will be pointed out later. For the most part, however, oral expression should doubtless be taught in connection with language—rather than reading—exercises.

Recent criticism of oral reading instruction.—As indicated above, the excessive emphasis upon oral reading was long accepted as a matter of course. More recently, however, there has been in evidence a growing disposition to criticize this practice. During the last few years the challenge—at first largely theoretical—has been tremendously reënforced by the experimental investigation of the reading process. Some of the studies discussed in the last chapter threw considerable light upon the differences between oral and silent reading. They indicated very clearly that one might read much more rapidly silently than orally. Quantz's subjects averaged for silent reading from 3.5 to 8.8 words per second and for ordinary oral reading only from 2.6 to 3.9 words. The averages for Huey's readers ranged at the ordinary rate from 2.5 to 9.8 words per second for the silent reading and from 2.2 to 4.7 words for the oral; at the maximum rate the averages for the former ranged from 3.5 to 13.5 words per second and those for the latter from 2.9 to 6.4 words. Oberholtzer's results showed that children—even under existing methods of instruction—have a tendency to read more rapidly silently than orally and that this difference increases from the lower to the upper grades. On the whole, C. T. Gray's subjects also read silently more rapidly. Furthermore, W. S. Gray's results pointed very

clearly to optimal periods for the teaching of oral and silent reading.

Investigations intended to compare the efficiency of oral and silent reading.—A number of investigations have been undertaken with the express purpose of comparing the efficiency of oral and silent reading. The comparison is usually made on the basis of rate and comprehension.

Pintner's investigation.—Pintner[1] reports an investigation with twenty-three fourth grade children. Eight tests were given for oral and eight for silent reading, the pupils reading in each case at their ordinary rate during an interval of two minutes. The reading selections were stories from "Arabian Nights." In the case of the silent reading the number of lines read during the two minute interval ranged from 10 to 89,—the average being 28; in the case of the oral reading the number of lines read ranged from 9 to 31,—the average being 20. The number of points correctly reproduced in connection with the tests for comprehension ranged from 6 to 18 for the silent reading and from 5 to 15 for the oral. These results, as Pintner indicates, show that children not only read more silently than orally but retain more as well.

Pintner and Galliland's investigation.—Later Pintner and Galliland[2] made a more elaborate investigation. The aim was to compare the efficiency of oral and silent reading at different levels of individual development. Accordingly 130 individuals—30 third and fourth grade pupils, 30 fifth and sixth grade pupils, 20 seventh and eighth

[1] See "Selected References" (6).

[2] See "Selected References" (5).

grade pupils, 20 high school students, and 30 college students—were examined. The materials read were selected with special reference to the interests and the abilities of the several groups, each passage representing approximately fifty words and seven distinct ideas. In order to secure a simple index for reading efficiency, the number of points reproduced in the case of any one selection was divided by the number of seconds required for the reading of the selection,—this giving "the percentage of points reproduced per second of the reading time." The indices for the several groups and the two types of reading were as follows:

GRADES	ORAL READING	SILENT READING
3-4	23.2	23.2
5-6	26.2	27.0
7-8	33.6	34.2
High School	23.6	25.2
College	33.5	38.4

It will be observed that there is no appreciable difference between the values for the two types of reading. Pintner and Galliland conclude that this tends to show that under existing conditions—oral rather than silent reading instruction being emphasized—children are not likely to develop efficiency in silent reading until they reach the high school period where more extensive silent reading is imperative. Also, they point to the significant fact that oral reading in spite of the emphasis which it receives in these grades shows no superiority in either rate or comprehension.

Mead's investigations.—Mead [1] also reports several in-

[1] See "Selected References" (4).

vestigations. He was particularly interested in comparing the efficiency of oral and silent reading from the standpoint of comprehension. In connection with the first of these investigations 112 Cincinnati pupils—five classes in all—were examined. Six two minute tests were given for each type of reading. The reading selections were chosen from "Alice in Wonderland." Mead found that all but one of these five classes read a greater number of lines silently than orally and that each class reproduced a greater number of possible points in silent than in oral reading.

During the next two years Mead tested 240 additional pupils—representing seventeen classes distributed from the third to the tenth grade. The conditions were identical with the above except that the pupils read for one instead of two minutes. In general "fifteen out of the seventeen classes" and "70 per cent of the children taken separately did better by the silent method of reading than by the oral." Mead concludes, therefore, that pupils "can gather more thoughts by the silent method than by the oral" and that much of the present excess emphasis upon oral reading in our schools should be transferred to silent reading.

W. S. Gray's investigation.—Gray [1] made an investigation of the oral and silent reading rates of 471 pupils and students at the School of Education of the University of Chicago. In the case of the oral reading, paragraph 3 of his Oral Reading Scale was read, and in the case of the silent reading, the selections were from his Silent Reading Tests. The results showed that the sec-

[1] See "Selected References" (2).

ond and third grades read somewhat more rapidly orally than silently. But throughout the other grades and the high school and college periods, the rate of silent reading was superior to that of the oral. Gray considers the fact that second and third grade pupils read more rapidly orally than silently significant. He feels that the first three grades represent the optimal period for the teaching of oral reading. Beyond this point continued emphasis upon oral reading may actually have "a retarding influence upon the rate of silent reading."

Judd and Gray's investigation in Cleveland.—Judd and Gray in making a preliminary investigation of the reading ability of the pupils in 44 Cleveland schools made extensive rate tests for both oral and silent reading. The passages read were chosen from graded readers. In terms of the number of lines read per minute the results for the two types of reading and for the several grades were as follows:

GRADES	LINES READ ORALLY	LINES READ SILENTLY
2	13	16
3	16	22
4	14	21
5	15	20
6	16	24
7	16	21
8	16	21

It will be observed that the rate for silent reading is materially higher than that for the oral. "The fact that there is not a greater difference in the upper grades," Judd holds, "is undoubtedly due in part to the influence

of school training. So constantly are children drilled in oral reading that their habits of recognition come to be controlled by this dominant form of instruction. Their natural tendency to cultivate rapid silent reading is, therefore, constantly counteracted by rigid school drill in the slow oral form of reading." [1]

A comparison of the ranges over which the oral and silent reading rates of pupils are distributed shows a marked tendency toward a close grouping in the case of the oral and a wide spreading out in the case of the silent. In other words pupils read much more nearly at the same rate in oral than in silent reading. In part Judd accounts for this condition by the fact that "the rate of oral reading is controlled in a measure by the physiological rate of movement possible in the vocal acts involved," and in part he feels that it is due to the fact that every member of a class in oral reading is drilled "under methods which are uniform." Finally he points to the fact—repeatedly demonstrated by scientific investigations—that silent reading rates may be developed which "are three or even four times as fast as the rate of oral reading" and stresses the necessity of placing much greater emphasis upon "productive silent reading." [2]

Schmidt's comparison of oral and silent reading on the basis of eye movement.—As indicated in an earlier chapter, Schmidt [3] investigated the eye movements of eighty-three individuals—forty-five adults, seventeen high school students, and twenty-one elementary school

[1] *Measuring the Results of the Public Schools.*
[2] *Op. cit.*
[3] See "Selected References" (7).

pupils—for both oral and silent reading. The two types of reading were compared largely on the basis of such factors as the average number of pauses per line, the average duration of the pauses, and the average fixation or reading time per line.

The adults required on an average from 6.5 to 11.3 pauses per line when reading orally—the average being 8.2; and from 4.7 to 10.8 pauses when reading silently—the average being 6.5; the high school students required from 7.2 to 10.2 pauses per line when reading orally—the average being 8.6; and from 5.0 to 9.6 pauses when reading silently—the average being 7.0; and the elementary pupils required from 6.1 to 11.5 pauses per line when reading orally—the average being 8.1; and from 4.1 to 9.3 pauses when reading silently—the average being 6.3.

The average duration of the pauses varied for the adults from .230 to .520 second when reading orally—the average being .380; and from .214 to .470 second when reading silently—the average being .308; for the high school students it varied from .306 to .512 second when reading orally—the average being .372; and from .244 to .414 second when reading silently—the average being .311; and for the elementary pupils it varied from .300 to .524 second when reading orally—the average being .398; and from .264 to .438 second when reading silently—the average being .314.

The average perception or reading time per line varied in the case of the adults from 1.70 to 4.05 seconds when reading orally—the average being 3.13; and from 1.14 to 3.68 seconds when reading silently—the average being 2.01; in the case of the high school students it varied from

2.35 to 4.17 seconds when reading orally—the average being 3.20; and from 1.37 to 3.36 seconds when reading silently—the average being 2.22; and in the case of the elementary pupils it varied from 2.21 to 4.45 seconds when reading orally—the average being 3.23; and from 1.18 to 2.96 seconds when reading silently—the average being 1.97.

It will be observed that oral reading makes without exception much heavier demands than does silent reading. It requires on an average approximately 25 per cent more pauses than silent reading. Also, the oral reading pause is fully 25 per cent longer than the silent reading pause. This means of course that the average perception or reading time per line—this being the product of the number and the duration of the pauses—will be approximately 50 per cent longer in oral than in silent reading. It must be borne in mind, further, that averages always tend to conceal individual phenomena—phenomena which are often of very great importance. Thus a detailed examination of Schmidt's results shows that some individuals make practically no distinction between oral and silent reading. They require as many and as long pauses for the one as for the other. On the other hand, there are those who read nearly three times as fast silently as orally—as shown by the average perception or reading time per line.

The remaining individuals are distributed between these two extremes. In part this individual variation is doubtless due to native differences—differences which cannot be swept away through training. Much of it, however, must be attributed to faulty training or to the

absence of training. We conclude therefore that there are probably few if any normal individuals who cannot be trained to read silently at a much higher rate than would be desirable in connection with oral reading.

Schmidt also measured the efficiency of comprehension for the two types of reading. A comparison of the results brought out no striking differences. The comprehension score for the elementary group was slightly higher for oral and that of the high school group slightly higher for silent reading. Beyond this an analysis of the results pointed to the conclusion that the relationship between rate and comprehension may not be the same for the two types of reading,—the rapid silent reader tending to surpass the slow in comprehension and the slow oral reader, the rapid.

Needed readjustments in the teaching of reading.—The investigations which we have reviewed emphasize the fact that oral reading receives altogether too much time and attention in our schools. Without exception the several investigators have protested against this practice. The marked differences between oral and silent reading have been stressed. It has been shown that the former is a slow and cumbersome process—limited in rate because of the demands of articulation, and apparently inferior in comprehension—especially as the rate is increased within these narrow limits. Its only legitimate purpose above the primary grades is to convey the thought of the printed page to others. This being the case, articulation must obviously be controlled and regulated in accordance with the requirements of a given situation—much depending upon the materials and the audi-

ence. The best oral reading is, therefore, rarely very rapid reading.

The limitations imposed upon silent reading are far more elastic. Its purpose is to get the thought of the printed page. Articulation—inner speech—may, therefore, be greatly reduced and circumscribed. In consequence the reader may proceed at a rate consistent with his power to interpret and assimilate. That maximum efficiency in silent reading—as conditioned by the reader's ability to interpret and assimilate—is rarely approximated at present, we shall point out later in connection with the discussion of skimming.

While the several investigators point out that children have a tendency—even under existing conditions—to read more rapidly and with superior comprehension silently than orally, they make it quite clear that this is only an indication of what might be. They are convinced that the prevailing emphasis upon oral reading instruction constitutes a serious hindrance to the development of efficiency in silent reading, partly because it monopolizes the time and the energy which should go to silent reading but, more largely, because of the habits of articulation and plodding which it fastens upon the pupil. There is, therefore, obviously need of a thoroughgoing reformulation of the aims and purposes and the methods of procedure in teaching reading,—not only in general but with special reference to particular grades and periods. Such a reformulation must in the very nature of the case involve readjustments in the emphases given to oral and silent reading.

The place of oral reading.—We have repeatedly indi-

cated in our discussion that oral reading instruction—when properly administered—will serve different purposes in the primary and in the elementary grades. In the case of the former, it is needed for word mastery and is, therefore, quite indispensable. Also, it is during this period that the gulf between the ability to articulate and the ability to recognize words is least pronounced. Articulation, as Judd points out in his recent monograph,[1] is relatively well developed even in the case of first grade pupils while word recognition is just entering upon a period of rapid and prolonged growth. Sometime during the third and fourth grades—and in some cases probably earlier—the rate of word recognition comes to surpass the possibilities for articulation. In other words, the pupil arrives at a level where he can recognize words and grasp meanings more rapidly than he can pronounce the words orally—not because of any defect in his pronunciation but on account of the natural limitations imposed upon articulation.

From this point on, oral reading instruction, if it is to serve any definite purpose, must aim very directly at training in oral expression. If this is to be accomplished in an effective manner, oral reading instruction must have at its command a subject matter and a method of procedure peculiar to itself. The reading materials should in the very nature of the case be relatively simple and of such a nature as to lend themselves readily to expression. This is obviously not true of many selections in our readers at present. Current methods of procedure likewise are in need of a thoroughgoing revision. The whole

[1] *Reading: Its Nature and Development.*

problem is admirably treated—by way of a concrete illustration—in the following excerpt from the report of a recent school survey:

> A departure from the usual procedure in oral reading, and one likely to forward this aim, was noted with approval in two classrooms. Ordinarily the child who is reading has no audience in any true sense. All members of the class have the same book and follow more or less attentively the reader's performance. He has no very strong motive for clear enunciation or the cultivation of a tone that will carry to distant parts of the room. No one needs to depend upon his performance in order to understand the paragraph or the selection which he reads. In these two instances the reading was from an interesting library book,—not the regular school reader. Only one copy was available, but the children who in succession read from this book had a real audience, and they held their audience, too. There was the keenest interest in the story, and the attention was absolute.
>
> If a child failed momentarily to make himself understood, mass sentiment made itself felt. The effort of the reader was directed toward making the class understand the story. The story was one which the class wished to understand, consequently the exercise claimed and secured the undivided attention of all.
>
> The practice of oral reading under conditions which hold the reader responsible for making the thought of the author understood by a real audience ought to be far more common in our schools than it now is.[1]

Obviously such oral reading instruction as is found above the primary grades should be largely of this type. On the other hand, however, it is highly probable that the type of expression which the average individual will have occasion to use most frequently in his daily social intercourse could be taught more advantageously in connection with the work in English through specific exercises in oral composition. Oral reading may, therefore,

[1] Cubberley, E. P.: *School Organization and Administration,* p. 83.

be expected to occupy a minor rank on the elementary school program—above the primary grades.

The place of silent reading.—As indicated above, sometime during the third and fourth grades, ability in word recognition begins to surpass ability in articulation. Since we assume that such word recognition implies a mastery of the meanings as well as the phonograms, this means of course that the individual has arrived at a stage in his reading development where he is able to get thought from the printed page more rapidly than he can express it orally. Obviously if his ability to get meanings from the printed page is to be further developed, it must be largely through silent reading. This alone represents the elasticity demanded by a reading rate constantly increasing with the growing assimilative powers of the individual. Silent reading should, therefore, in the very nature of the case occupy an important place on the elementary school program—above the primary grades.

This does not mean of course that there is to be no silent reading instruction in the primary grades. The investigation of reading ability through a study of eye movement has shown that pupils as far down as the second and third grades require generally fewer pauses and shorter pauses when reading silently than when reading orally. With few exceptions, the other investigations—those comparing the achievements of oral and silent reading directly—have shown that the pupils of these grades tend to read more rapidly silently than orally. Furthermore, the evidence of a number of investigators showed quite clearly that individuals have a tendency to approximate their maximum ability for *careful* silent reading at

an early age, at least as early as the fifth and sixth grades and probably in many cases much earlier.

This leads us to the conclusion then that training in silent reading should begin early. It may well receive considerable attention in the primary grades—and this in spite of the fact that these grades represent the optimal period for instruction in oral reading. The two may be cultivated side by side. During the succeeding grades—the fourth, fifth, and sixth—the emphasis should be placed upon training for rapid and effective silent reading, oral reading being utilized to some extent to afford training in oral expression. At the close of the elementary period the pupil should be a relatively accomplished reader. During the junior high school period—grades seven, eight, and nine—reading instruction will naturally become a part of the work in English. The pupil then will have ample opportunity for practice in rapid silent reading.

Necessity of clearly defined aims and carefully worked out methods for teaching silent reading.—The teaching of silent reading—if it is to be effective—must be based upon clearly defined aims and carefully worked out methods of procedure. It might be inferred from much of the discussion which has preceded that the only objectives of silent reading are a rapid rate and efficiency in reproducing specific points. As a matter of fact silent reading implies much more. It implies above all the ability to react to the materials of the printed page in a critical manner—the ability to use them in the solution of daily problems and for purposes of general intellectual growth. Silent reading and study are, therefore, essentially

synonymous. Therefore training in silent reading implies training in study and training in the use of books. This means of course that training in silent reading should be closely correlated with the work in other subjects. It stresses the necessity of making the reading exercise specific and purposeful. The continued reading of selections for no other purpose than to restate in general what has been read is at best a questionable practice. For the most part the pupil should read with specific problems in mind—problems which have been defined under the direction of the teacher before the reading begins. The pupil should be judged largely by the speed and the accuracy which he displays in connection with reading of this kind.

As the pupil advances from grade to grade the amount of reading which he must do necessarily increases. It becomes increasingly important that he should be able to survey materials rapidly—often in advance of more intensive study for the purpose of determining the general trend of the discussion and the points of emphasis. Reading of this kind is not uncommon among adults who have become skilled in the use of printed materials. It is often a mere skimming,—words, phrases, sentences, and even large portions of paragraphs being omitted. For general survey purposes such skimming represents a decided advance over rapid silent reading in which every word is read. It is doubtless at this point, more than anywhere else, that the experienced and trained adult surpasses the high school pupil and the elementary pupil in reading efficiency. It is highly probable, however, that ability in skimming could be developed much earlier

through directed training. The junior high school period would seem to offer an excellent starting point, the pupil being led gradually from rapid silent reading to skimming.

Whipple's investigation of skimming.—A recent investigation reported by Whipple[1] throws considerable light upon the nature of skimming and its relation to reading. Six subjects—university students and instructors—were tested for both oral and silent reading and for skimming. Whipple found the usual individual variation—one individual, for example, skimming three times as fast as another. He discovered that there was a close relationship between an individual's ordinary rate of reading and his "preferred rate of skimming." In general skimming was most successful when the reader was allowed to proceed at his own rate and when the subject matter lay distinctly within the range of his information. There was also in evidence a progressive improvement as an individual passed from the first to the last part of a selection.

The devices adopted in skimming varied widely—the procedures of the several subjects having little in common beyond the reading of the topic sentences. "One individual reported that she read the topic sentences carefully and then followed down the sides of the paragraph, catching an important word occasionally and thus following the sentence until the verb was reached." Another "read the topic sentences and then keeping these in mind skimmed down the center of the page for new ideas of importance. She usually read some or all of the con-

[1] See "Selected References" (8).

cluding sentences." Still another "skimmed from topic to topic keeping the leading ones in mind, omitting the middle portions of sentences and emphasizing nouns." Whipple concludes that skimming is distinctly advantageous and that it might well be cultivated in the public schools.

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CHAPTER X

THE CONTENT OF READERS

One of the most important and persistent problems of reading instruction concerns the nature of the materials to be read. Since these are for the most part embodied in series of readers, any discussion of this problem must of necessity center largely about the content of readers.

Early content chiefly religious.—The forerunner of the modern reader—the primer—was dominantly religious in character. The earliest printed A B C books—Catholic and Protestant alike—contained both the alphabet and the creed. The corresponding primers which were used by the older children were to all intents and purposes manuals of church service. In fact they were the immediate forerunners of the "Book of Common Prayer." In time the A B C books and the primers became united into one book—the primer.

"The New England Primer."—In this country the most popular of these primers was the famous "New England Primer" published about 1690. "For one hundred years," as Ford points out, "this primer was the school book of America, and for another hundred it was frequently reprinted." He estimates that some three million copies have been sold.[1] During this long period

[1] *The New England Primer.*

the book naturally underwent many changes—without, however, at any time losing its essential characteristics. Reeder gives the following summary of the contents of the edition of 1777:

A child's morning and evening prayer; the alphabet, vowels, consonants, capitals, small letters, syllabariums consisting of ab, eb, ib, etc., and lists of words for spelling arranged according to the number of syllables beginning with monosyllables and ending with abomination, exhortation, etc.; a lesson for children including such unadorned moral injunctions as: Pray to God, Tell no lies, Call no ill names, Mind your book, Be not a dunce, etc.; a series of woodcuts associated with the letters of the alphabet in order beginning with the tree of forbidden fruit, the serpent, and our first parents, and all arranged in appropriate rhyme. Thus:

In Adam's fall
We finned all.

The Deluge drown'd
The Earth around.

As runs the glass
Our Life doth pass.

Young Obadias,
David, Josias
All were pious.

Zaccheus he
Did climb the Tree
Our Lord to fee.

Next, the Catechism beginning with easy questions: Who was the first man? the first woman? the first murderer? the first martyr? the oldest man? the meekest man? the strongest man? etc.; an infant's grace before and after meat; an alphabet of lessons for youth, using proverbs and other Bible admonitions, the Lord's Prayer, the Creed, Dr. Watt's Cradle Hymn, "Hush my Babe,"

PICTURE ALPHABET ILLUSTRATING THE RELIGIOUS JINGLES OF THE EARLY PRIMERS

etc.; a picture of the burning of John Rogers at the stake, "witnessed by his wife with nine small children and one at the breast," followed by a long posthumous poem of advice and warning to his children. Then the Shorter Catechism by John Patton called Spiritual Milk for American Babes drawn from the breasts of both Testaments for their soul's nourishment. The book closes with a tragic scene in which Youth, after alternately listening to the admonitions of Christ and the solicitations of the Devil, weighs his destiny, vacillates, and finally chooses the evil and goes to hell.[1]

Gradual secularization of reading materials.—With the passing of the eighteenth century and the coming of the nineteenth, reading materials became gradually secularized. This was due to a variety of causes: Puritanism was making way for more liberal and more diversified religious views; national growth and material development brought with them many and varied interests; the schools themselves were passing more and more under state and secular control; and, finally, the views of such educators as Comenius, Rousseau, and Pestalozzi—views which called for greater adaptation to child nature—began to be felt, especially with the passing of the first quarter of the century. In spite of this secularization, however, much of the content retained a strong moral and religious tone. As Mahony points out, "the idea is constantly reiterated that it is profitable both spiritually and materially to be good. Right and wrong are always presented in the sharpest contrast. Evil suffers prompt and severe punishment and good is as promptly and decisively rewarded." Patriotism also assumed an increasingly important place. And as time passed, science, his-

[1] *The Historical Development of School Readers*, pp. 15–16.

tory, and literature came to be incorporated more and more.

Webster's "Elementary Spelling Book."—The most important book of the new era—the era of secularization—was Webster's "Elementary Spelling Book"—a combination speller and primer. Immediately upon its publication in 1783 this book began to displace the "New England Primer" as the book for beginners and also such spellers as had come into use previously. In fact so popular did this book prove that two years after its publication it was selling at the rate of five hundred copies per week. By 1880 the sales had reached a total of more than 80,000,000, and it was selling heavily even during the early part of the present century.

As indicated above, the "Elementary Spelling Book" was a combination speller and primer. Some editions also contained geographical and grammatical treatises. However, in a preface written as early as 1823 Webster says: "Geography and Grammar are sciences that require distinct treatises, and schools are furnished with them in abundance. It is believed to be more useful to confine this work to its proper objects—the teaching of the first elements of the language, spelling and reading. On this subject the opinion of many judicious persons concurs with my own." Like its predecessor—the "New England Primer"—the "Elementary Spelling Book" suffered many changes during its long career and yet never lost its essential characteristics. An edition printed in 1823—the oldest edition which the writer has had an opportunity to examine—contains 168 pages. Approximately 16 pages are devoted to the preface, an analysis

of the sounds of the English language, a key to pronunciation, the alphabet, and a syllabarium. Long lists of words classified on the basis of number of syllables, accent, derivation, orthographic analogies, etc., extend over some 60 pages. Nearly 30 pages are devoted to personal and geographical names—mostly the latter. A few pages are devoted to numbers, abbreviations, a census of the United States, etc. Finally about 60 pages are devoted to such content as maxims, illustrated fables, poems, precepts concerning social relations, a history of the creation of the world, and a moral catechism. The following is a typical reading lesson:

> Be a good child; mind your book; love your school; and strive to learn.
>
> Tell no tales; call no ill names; you must not lie, nor swear, nor cheat, nor steal.
>
> Play not with bad boys; use no ill words at play; spend your time well; live in peace, and shun all strife. This is the way to make good men love you, and save your soul from pain and woe.

The precepts concerning social relations begin as follows:

> Art thou a young man seeking a partner for life? Obey the ordinance of God, and become a useful member of society. But be not in haste to marry, and let thy choice be directed by wisdom.
>
> Is a woman devoted to dress and amusement? Is she delighted with her own praise, or an admirer of her beauty? Is she given to talking and loud laughter? If her feet abide not at home, and her eyes rove with boldness on the faces of men—turn thy feet from her, and suffer not thy heart to be ensnared by thy fancy.
>
> But when thou findest sensibility of heart joined with softness of manners, an accomplished mind and religion, united with sweetness of temper, modest deportment, and a love of domestic life—such is the woman who will divide thy sorrows and double the joys

of thy life. Take her to thyself; she is worthy to be thy nearest friend, thy companion, and the wife of thy bosom.

Similar advice is given to young women and to husbands and wives. The moral catechism which occupies some 12 pages resembles the church catechism except that it deals with such topics as moral virtue, humility, mercy, peacemakers, purity of heart, anger, revenge, justice, generosity, gratitude, truth, charity, avarice, frugality, economy, industry and cheerfulness.

Early readers.—School readers in the modern sense of the word began to make their appearance almost simultaneously with Webster's speller. In general these books furnished more abundant and more suitable reading materials than the Primer, the Psalter, and the Bible. The content of these readers, as indicated earlier, although increasingly secular had a strong moral, patriotic, and religious tone. In addition most readers of this and the succeeding period contained rather elaborate treatises on elocution and the laws of expression. At first readers appeared in single volumes, but they soon came to be issued in series of two and three—usually an introduction, a middle book, and a sequel. These series were supplemented by a primer and a speller or—as in the case of Webster's speller—by a book which combined the two. As time went on, primers—more suitable for beginners than the spelling book—made their appearance. In consequence the latter came to occupy more and more the place of a speller in the sense in which the word is now used.

The most popular readers of this period—the period from about 1785 to 1830—were: Webster's "An Ameri-

can Selection of Lessons in Reading and Speaking," published about 1785; Bingham's two books—"The American Preceptor" and the "Columbian Orator," published in 1794 and 1797 respectively; Lindley Murray's three book series—"The English Reader," "The Introduction to the English Reader," and "The Sequel to the English Reader," introduced into this country during the early part of the century; Pierpont's four book series—"The Young Reader," "The Introduction," "The National Reader," and "The American First Class Book," published in 1823; and Cobb's "Juvenile Readers," published in 1831.

Webster's reader.—Webster's reader was not so popular as his speller nor so widely used as the other series mentioned above. The book, as Reeder points out, contained "many selections from American statesmen and patriots"; also "narrative and descriptive prose selections and poetry"—intended for the most part to inculcate "moral and religious sentiments"—but "scarcely any piece that could be classed as literature."

Bingham's readers.—These readers were very popular. As in the case of Webster's book, the selections were for the most part of American authorship—few being literary in character. Fiction was purposely avoided—because of its tendency to instill "false notions into the minds of children." In characterizing the content of "The American Preceptor," Reeder says: "There is a poem by Pope and one by Cowper; Franklin's story of the whistle appears. Many pieces are upon abstract subjects with no author's name attached and many are by obscure writers; there are several stories and anecdotes; patriot-

ism is a marked feature." The poetry of the "Columbian Orator," Reeder continues, "was from Hannah More, Addison, and Rowe." The book contains also "a number of addresses made in Congress, in the British Parliament, and by generals to their armies." [1]

Lindley Murray's series.—From a literary standpoint Lindley Murray's series—compiled in England—surpassed other books of its time, selections from Addison, Goldsmith, Pope, Gray, Cowper, Milton, and Wordsworth being quite common; but—as happens so often under such circumstances—the materials were not as well adapted to the needs and interests of children as those of more humble authorship in the American series. Reeder's characterization of the middle book—"The English Reader"—will afford some idea of the content of this series:

> The introduction devotes some eight pages to the principles of good reading. The book is divided into the following chapters: Select sentences consisting of proverbs, moral maxims, etc.; Narratives, including Bible stories and other moral content; Didactic, under which are lessons on gratitude, forgiveness, gentleness, a suspicious temper, comforts of religion, dignity of virtue, mortification of vice, moderation of wishes, etc.; Argumentative, including brief dissertations upon virtue and piety, man's highest interest, the injustice of an uncharitable spirit, disinterested friendship, the immortality of the soul, and others of like unquestioned moral worth; Descriptive, consisting of such selections as the creation, charity, the beauties of the Psalms, character of King Alfred, the man of integrity, and the character of Queen Elizabeth. Other chapter headings were pathetic pieces, dialogues, and public speeches; under all of which strong meat, not milk for babes, was served to the youth of the early schools of the century.[2]

[1] *Op. cit.*, pp. 36–38.
[2] *Op. cit.*, pp. 39–40.

Pierpont's series.—This series represented much that is highly commendable. The usual treatise on expression was omitted. The author having observed "that that part of schoolbooks which consists of brief treatises upon rhetoric, rules for reading, and essays on elocution is almost uniformly little worn," concluded "that it is of little use" and that "reading like conversation" must be "learned from example rather than by rule." The content was strongly American, though not arrogantly so, since "selections were made from the best American and English writers." The following extract from the preface of the third book, "The American First Class Book," explains why the author favored American selections in contrast to the exclusive use of English materials, as in the Lindley Murray series:

> This country has political institutions of its own, institutions which the men of succeeding generations must uphold. But this they cannot do unless they are early made to understand and value them. It has a history of its own of which it need not be ashamed—fathers, heroes, and sages of its own, whose deeds and praises are being said or sung by even the mighty "masters of the lay" and with whose deeds and praises by being made familiar in our childhood, we shall be not the less qualified to act well our part as citizens of a republic. Our country both physically and morally has a character of its own. Should not something of this character be learned by its children while at school? Its mountains, and prairies, and lakes, and rivers, and cataracts; its shores and hill tops that were early made sacred by dangers and sacrifices, and deaths of the devout and the daring; it does seem as if these were worthy of being held up as objects of interest to the young eyes that from year to year are opening upon them, and worthy of being linked with all their sacred associations to the young affections which sooner or later must be bound to them, or they must cease to be what they now are—the inheritance and abode of a free people.

Cobb's series.—The most commendable feature of Cobb's series appears in the fact that he aimed to adapt the choice and the arrangement of his materials to the needs and interests of children—in so far as such a thing was possible at that time. His was accordingly, as Reeder points out, "the first carefully graded series of readers produced in America." At first the series consisted of three volumes; later the number was increased to five. Cobb's selections were mainly of American authorship. From a literary standpoint they were inferior to those of Pierpont, but—as indicated above—they were much better adapted to the needs and interests of children. "The three juvenile numbers contained no literature whatever. They comprised stories, information lessons about animals, and a great many definitions, forming a sort of child's dictionary." In the last book of the series,—"The North American Reader,"—"the Declaration of Independence and the Constitution are inserted. Many of the selections are by obscure writers. Many are of a political and patriotic trend. A number are by senators, presidents, and statesmen." For "poetry Shakespeare, Shelley, Campbell, Byron, Montgomery, and Mrs. Hemans are drawn upon." The popularity of the series was such that some six million copies were sold.

Mid-century readers.—From 1840 to 1880 school readers multiplied rapidly. Almost without exception they appeared in graded series of from five to six volumes. Pierpont's protest against elaborate treatises on expression does not appear to have been taken seriously for, as Reeder points out, "in almost every series produced in this middle period of American authorship considerable

space"—sometimes as much as fifty pages in the case of the upper volumes—is "devoted to the various accessories of good reading including the principles of elocution, rhetoric, and orthoëpy." The emphasis on elocution is further reflected in the content of the readers of this period, selections which lend themselves readily to expression being very common. Beyond this, the reading materials of this period differ from those of the preceding chiefly in being more varied, the range of topics being in many cases almost encyclopedic. The moral tone, too, is less austere, although the practical virtues are strongly emphasized throughout the period. The majority of the selections are not strictly literary in character; and those which approximate literary standards are for the most part extracts and adaptations from larger wholes. These characteristics—the encyclopedic, nonliterary, and fragmentary character of the selections—have been severely condemned. With all their defects, the better series of this period are obviously superior to some of those published during the early part of the present century.

The McGuffey readers.—The McGuffey readers—published in 1850—represent by far the most popular series of this period. "In range of subject matter," as Reeder points out, this series "swept almost the entire field of human interest—morals, economics, politics, history, science, and philosophy." The selections—although often adapted and in the case of the lower numbers frequently rewritten—were on the whole of excellent authorship. To a marked extent, too, the choice of materials was determined by the interests of children. Thus in the preface to the new edition of 1857 the compilers state: "Such

lessons as discriminating practical teachers have found the least interesting have been removed, and others, with large additions—especially of primary matter—have been introduced." Much attention was directed toward the careful grading of the selections in order that the pupils might be "led forward step by step along an easy gradation."

Provision was made, further, for ample drill on spelling and pronunciation. In the fifth reader of the edition of 1857 twenty-eight pages are devoted to directions for reading, articulation, inflection, emphasis, accent, modulation, pauses, etc. In addition, almost every reading lesson is accompanied—and probably for very good reasons from the standpoint of the language problems of the time—by specific corrective exercises in pronunciation such as the following:

> Pronounce correctly. Do not say *nar-rer* for *narrow; pen-it-trate* for *pen-e-trate; se-crits* for *se-crets; na-tur* nor *na-tshure* for *nature; be-yend* for *be-yond; cal-ky-late* for *cal-cu-late; an-er-lyz'd* for *an-a-lyzed; nat-shu-ral-ist* for *nat-u-ral-ist; spec-ky-late* for *spec-u-late; flu-ne-cy* for *flu-en-cy; pi-an-er* for *pi-a-no; per-tic-er-lul-ly* for *par-tic-u-lar-ly.*

Late nineteenth and early twentieth century readers.—Since 1880 school readers have appeared in increasing numbers and have succeeded each other rapidly—few enjoying the long-lived popularity of some of the early and mid-century series. On the whole the late nineteenth and early twentieth century period—roughly from 1880 to 1910—has been one of marked progress. In fact it was during these years that the literary reader of to-day was evolved. This accounts in no small part for

the rapid succession and the more or less limited popularity of many of the series of this period—not a few of which represented genuine merit in one respect or another.

After 1880 the thesis that the content of school readers should be literary in character came to be generally accepted. In actual practice, however, it was difficult to realize this ideal—so much so indeed, that it was not until well toward the close of the period that a suitable literary content was incorporated in all numbers of the series. Hardy—writing in 1891—characterizes the situation as follows:

> The first years of a child's school experience are devoted to initiating him into the mysteries of the alphabet and the primer. Having mastered their difficulties, he passes onward to a graded series of readers which as a rule consist of five books—"the five inanities" they have been called. The briefest examination of any of these books will show that the average reader is a purely haphazard collection of prose and poetical extracts of varying degrees of literary merit. In the lower numbers the contents are of such vacuous and insipid character and appeal so slightly to the interests or to the imagination of the child, that one is unavoidably forced to conclude that the selections have been made to order for grading purposes only. The third and fourth readers are less trivial perhaps, but even more commonplace. Where the selections have not been taken outright from standard works, they are generally feeble and uninspiring; and their literary value is nil, whether we examine them from the point of view of their thought content, the language in which they are written, or the form in which they are cast. The literary value of the higher numbers is generally greater, inasmuch as the lessons are made up almost entirely of extracts from standard authors. Although the selections are not always wisely or even happily made, yet these readers present to children their only opportunity of coming into contact with real literature during their school course.[1]

[1] *Educational Review,* II: 140–150.

President Eliot—writing at about the same time—is even more severe in his denunciation of the fragmentary and nonliterary character of the content of school readers. He says:

> I have paid some attention to the readers in our public schools throughout the country. I have read an enormous quantity of them, and can express the conviction that it would be for the advancement of the whole system if every reader were hereafter to be excluded from the schools. I object to them because they are not real literature; they are mere scraps of literature, even where the single lessons or material of which they are composed are taken from literature. But there are a great many readers that seem to have compositions expressly for children. They are not made from selections of recognized literature, and as a rule this class is simply ineffable trash. They are simply unfit material to use in the training of our children. The object of reading with children is to convey to them the ideals of the human race. Our readers do not do that and are entirely unfitted to do it. I believe we should substitute in all our schools real literature for readers.[1]

While there was doubtless in many cases ample justification for criticism, it must be borne in mind that some of those who represented the advanced literary ideals of the time were inclined to take rather extreme positions regarding the place of literature in our schools. Not only did they overestimate its educational function and value —for reasons which we cannot elaborate here—but they often failed to realize that the normal elementary school child is not sufficiently mature to be deeply interested in "the ideals of the human race," especially when couched in adult literary form, and literature it must be remembered was much more rigidly defined at that time than it is to-day. It is not surprising, therefore, to find that

[1] Eliot, Chas. W.: *Educational Reform;* The Century Company.

actual attempts to incorporate the extreme literary point of view in series of readers have not been successful because the demands such books made upon children rendered them generally impracticable. The eminently successful literary series of to-day are of course based upon a very different conception of literature—embodying as they do for the most part the literature of childhood.

As indicated earlier, the rank and file of teachers and educators—including the compilers of the school readers—were not opposed to literature in the schools. On the contrary they were busily engaged in introducing it. Only—in contrast with those who represented the extreme literary point of view—they were keenly aware of many of the practical difficulties. They found through actual experience that there is a vast gulf between the interests of childhood and adult literature. Moreover, most literary works comprised relatively large units while the school reader was limited in size and was in the very nature of the case required to represent some variety in content.

The compiler of the school reader was, therefore, face to face with problems the solution of which was anything but easy—problems which could for the most part be solved only with time and experience. Such being the case, the striking fact about the readers of this period is not so much that they contain material which might well be criticized but rather that they represent as much excellence as they do.

Until well toward the middle of this period few—if any—compilers attempted to introduce literary materials to

any extent into the lower numbers of the series; and some have made little effort to do so even during the latter part of the period. The selections in these numbers are, therefore, often rather commonplace and sometimes they are artificial and disjointed. There are, however, many exceptions. Indeed, in not a few of the series the content of the lower numbers is delightfully pleasing and interesting.

In the words of the compiler of one of the series published during the early eighties, "earnest effort was directed"—in the case of the first two books—"to the difficult task of furnishing fitting food for the child mind —to providing readings that shall be simple without being silly." In the case of the next two books an attempt was made—and quite successfully too—"to introduce a little of what may be called *organism* by carrying on a certain number of pieces (about one half) on distinct strains—a series of lessons on 'Home Pets,' as the living forms most familiar and interesting to children; a second series 'Bright Examples,' to touch and stimulate the affections; a third series 'About Plants,' as a slight glimpse of nature in one of her most attractive aspects; etc."

A stronger illustration of the possibilities of such materials is afforded by the primer and first three numbers of a series published some twenty-five years later. In the words of the compilers, the content of the first number "is the content of the happy life of childhood. Here are bees, butterflies, and grasshoppers; here are birds—little birds in their nests; here are flowers—the dandelion, the daisy, the clover, the rose, the violet, the lily; here are

pussy cats and pussy willows, mice and squirrels; here are ducks, geese, and foxes; here are spring, fall, summer, and winter, and the delightful things that each season brings; here are the sun, the moon, the stars; here are rain, ice, and snow; here are the meadows, the green grass, and the flying leaves; here are fairies and a giant; here are the lullabies that dear mother sings to tired children; here are stories and events in which all these delightful companions of childhood take part. Children who read this book join the happy company—joyfully live the scenes in imagination and eagerly enact them in dramatization."

In the second and third numbers, "stories, poems, and illustrations are full of action, full of appeal to the childish imagination. Everything is alive, is personified; the moon, the wind, the rain, the grass, the seeds, the trees and flowers, as well as the children and the simple people, the animals, and the fairies, all live and speak the language of the child's heart and imagination."

The series which have introduced literature in the lower numbers fall in two classes—those utilizing and adapting simple selections from the field of general literature; and those drawing largely upon the literature of childhood—rhymes, jingles, folk stories, fairy tales, legends, and fables. Books of the first class began to appear in the early nineties. In one of these series a considerable number of the selections in the second reader are intended to introduce the pupil to Longfellow. For the most part these selections are biographical and—as far as possible—of such a nature as to appeal to children. Incidentally some of Longfellow's simpler poems—"Children," "The Village Blacksmith," etc.,—are introduced.

A considerable portion of the third reader is given over to Whittier, Lowell, and Julia Dorr. In addition there are selections from such writers as Tennyson, George Macdonald, and the Grimm brothers.

Books of the second class began to appear somewhat later. In the words of one of the earliest compilers the content of the lower numbers comprises "rhymes and jingles which have sung themselves generation after generation in the nursery or on the playground; short stories which have been told since the world was young; old fables in which the teachings of long experience are embodied; legends and fairy tales which form the traditional common stock of the fancies and sentiments of the race." This kind of literary material—once it was presented in attractive form—proved to be very popular.

The content of the middle and upper numbers of the series of this period is dominantly literary—almost without exception in the case of the upper numbers. As might be expected, the selections are by no means always well adapted to the needs and interests of children. Milton's *L'Allegro* and *Il Penseroso*—which are found in the upper numbers of some of the series—would obviously make a very meager appeal to seventh and eighth grade children. Besides, the selections are quite commonly fragmentary, the prose for the most part being extracts from larger wholes. Not infrequently one finds upward of one hundred of these selections in a given number of a series. With all this, many of the series represent much excellence. Some compilers have shown marked skill in choosing relatively long selections and in grouping shorter ones so as to give them some degree of unity.

In a series published during the early eighties the content of the highest number is grouped under twenty authors—ten British and ten American—the first being Shakespeare and the last Lowell. Each author is introduced through an interesting biographical sketch. The plan of another series—the middle and upper numbers of which were published during the last years of the nineteenth century—is well stated in the compiler's introduction to the fourth reader:

> It has been deemed best to continue the plan of the previous books of the series and introduce several central figures. We have been reading and becoming acquainted with the American poets; now we enter a new field of literature, and the great prose writers, Hawthorne, Irving, Dickens, and Scott, with the English poet Tennyson, shed the influence of their character and writings in the classroom. The pupil looks into their faces and visits their homes. Their early childhood, their battle with adversity, and the influences that determined the currents of their lives become familiar. Then with awakened interest and admiration, he reads the messages they have left behind them. Characteristic selections from these authors have been carefully chosen with reference to the capacity of the children. These selections have been somewhat abridged but it has been thought wiser to have them a little longer than many textbooks introduce, rather than to mar the symmetry and beauty of the author's work.

Current readers.—During the last ten years school readers have multiplied rapidly. In part at least this is due to the fact that pupils now read a considerable number of books in the course of a semester or year whereas formerly one sufficed. With the partial exception of some of the most recent series, the content of current readers is dominantly literary; and the selections are mostly such as appeal to the interests of children.

The content of the lower numbers is drawn largely from the literature of childhood—rhymes, jingles, folk stories, fairy tales, legends, and fables. The selections represent on the whole relatively large and complete units. While the lower numbers of the last period often contained upward of one hundred more or less isolated selections, the first three books of one of the recent series contain from twelve to twenty-one—each being a relatively complete classic of childhood. The primer of another series is made up of a few beautifully illustrated rhymes and songs. The content of the first reader is limited to three old English rhymes, three jingles, three selections from Mother Goose, seven child stories, three legends, four old English tales, three fairy tales, four selections from folklore, three Russian wonder tales, and two poems—thirty-five selections in all. In the case of some of the most recent series there is in evidence—as indicated above—a tendency to depart somewhat from established literary paths and to select materials which make perhaps a more immediate appeal to children. "The child's own life," the compilers of one of these series hold, "is the basis of his interests." Accordingly one finds in the primer and the first reader of this series an interesting and continuous story, a story about the adventures and activities of normal boys and girls. The literary materials—rhymes, folklore, and fables—which enter into these numbers are so skillfully woven into the narrative that they become a part of the experiences of the children.

The content of the middle and upper numbers of current series is drawn largely from the wider fields of

literature. In fact there is in evidence a strong tendency to interpret the term "literature" with increasing liberality. Indeed, materials which were tabooed a few years ago are to-day quite within the pale of literature. Even those who maintain relatively rigid literary standards are commendably liberal in their outlook. "A classic," the compilers of one of the most complete of recent literary series tells us, "is not necessarily abstruse, difficult, or remote from common life. It is a piece of literature that has received the approval of good judges for a long enough time to make that approval settled." It "may be as old as Homer or as new as Hawthorne; it may be as difficult as Dante or as simple as Mother Goose. Indeed, a large proportion of the classics of the world are very simple. In Æsop and Homer, and the old fairy tales, and many of the great stories of the world like 'Robinson Crusoe,' their simplicity is one of their highest merits." The materials in these literary series are, therefore, for the most part such as appeal to the interests of children.

What is more, the compilers of some of the most recent series have gone so far as to admit considerable non-literary material in the middle and upper numbers. Indeed, in the introduction to one of these series the compilers state quite frankly that they "have purposely avoided the established paths of literary reputation, and have selected from a wide variety of sources interesting materials representative of the printed matter the child will inevitably read." That there is much to be said in favor of this departure—which may assume material proportions in the near future—we shall point out later.

As in the case of the lower numbers, there is evidently

a growing tendency to choose longer selections or—where this does not appear practicable—to group the selections, as in the previous period, about some central idea so as to give at least some degree of unity. Thus in the case of one of the series, each number—beginning with the fourth reader—is divided into two parts, one containing general selections and the other selections grouped under several authors. As the series advances, selections of the first type decrease and those of the second increase. In the fourth reader there are forty general selections and twelve grouped under three authors; in the eighth there are fourteen of the general selections and thirty-four grouped under eleven authors. In another series the interest centers about the "out of doors" in the fourth reader; about "stories of action and their revelation of character" in the fifth; about "world famous stories" in the sixth; about "the history and ideals of our country" in the seventh; and about "those authors who from Shakespeare to Tennyson have been the glory of the English race" in the eighth.

Special and supplementary readers.—Our discussion thus far has centered largely about the regular graded series of readers—the content of which was for a long time encyclopedic but has more recently become dominantly literary. At a comparatively early date, however, there began to appear readers which concerned themselves "with some special department of knowledge or interest." One of the first of these was Adam's "Agricultural Reader"—published in 1824. The book contained much information which was interesting and valuable. In 1827 Blake's "Historical Reader" appeared.

The selections were chosen from both general and American history. The first complete series to launch into specialization, Reeder tells us, was the Willson seven book series, published in 1860. The chief purpose of this series was to supply information "along all lines of science, beginning with the near at hand and moving toward the remote,—lessons on conduct and morals" being inserted here and there. Subsequently a number of special series appeared. For the most part these received rather scant recognition, however,—largely because of our increasing bias toward a literary content.

Nevertheless, special materials found their way into our schools, for the most part through the medium of the ungraded supplementary reader. Books of this kind have increased tremendously during the last few decades. Most commonly the materials have been drawn from such fields as biography and history, geography, pure and applied science, and economics. On the whole biographical and historical materials have been most popular. In recent years geographical materials also have come into great favor—and rightly so. Unfortunately the natural and applied sciences—which offer almost unlimited possibilities—have been drawn upon all too sparingly. The economic and sociological fields, likewise, have been barely touched upon.

To a great extent the supplementary reading materials in our schools have been drawn from the field of literature. In many cases—especially in the lower and middle grades—such materials are supplied through additional series of readers. In the upper—and to some extent in the middle grades as well—whole classics have been used

extensively for years. Indeed, in many instances these have proven so popular that they have quite supplanted the usual series—both regular and supplementary—as President Eliot suggested in the early nineties.

The future of the school reader.—The present highly perfected literary series—the evolution of which we have been tracing—are largely the outgrowth of a *cultural* conception of the purposes of teaching reading. For several decades the aims of reading instruction have been thought of largely in terms of acquainting the pupil with literature and of developing in him as far as possible a capacity for literary appreciation. Along with this there has of course gone the assumption that the pupil who has learned to read literature appreciatively has also incidentally acquired the ability to read content materials in an effective manner. As a matter of fact, this assumption is probably far from true. In other words, it appears to be one thing to read a story or a poem appreciatively and quite another to read a content selection in such a manner that the essential facts may be selected and used for purposes of constructive thinking.

It is, therefore, not surprising to find that our elementary schools—in spite of the fact that they have been devoting much of their time to reading instruction—have in many cases fallen far short of developing genuine reading ability. Indeed, the helplessness which pupils so often display in the presence of their school work in the intermediate grades—and even in the high school—is in no small part due to the fact that they have not been trained to read for purposes of constructive thinking.

Current aims of teaching reading—in so far as their

bias is *too cultural*—are, therefore, in need of revision. In other words, we must recognize the necessity of teaching reading for purposes of constructive thinking quite as much as for appreciation. Indeed, one of the chief functions of the school is to train the pupil to form sound concepts and to use these effectively in the solution of the problems of everyday life. This being the case, the pupil must be taught to read a wide variety of materials; and he must be taught to read discriminately to the end that he may utilize the content of the printed page in the formation of concepts and the solution of problems. Such a revision of the aims of teaching reading will in the very nature of the case have important bearings upon the content of readers.

Since most schools use several readers in the course of a given semester or year, the basic series of readers may well continue to be of a literary character; provided the term literature be interpreted with such liberality that the materials included will assuredly meet the needs and interests of normal children. In the case of the elementary school—grades one to six—such series will constitute the chief media of introducing children to the literature which is intended for them. In the case of the junior high school—grades seven to nine—literary studies may be carried on far more effectively through the use of whole classics.[1] The upper numbers of the series may, therefore, be expected to disappear in the near future.

Aside from the content of the basic literary series, the

[1] For specific recommendations consult the *Report of the National Joint Committee on English,* U. S. Bureau of Education, Bulletin, 1917, No. 2, especially pp. 45–53.

bulk of the reading materials should be drawn increasingly from the special fields—biography and history, geography, civics, economics, and sociology, and the natural and applied sciences. Materials of this kind—when prepared from the point of view of children—have unlimited possibilities. Not only do they furnish the matter of fact content so essential for effective training in constructive thinking but they supply in large measure the facts which children need for normal mental growth.

The extensive use of materials drawn from the special fields raises the question of their preparation. Obviously materials of this kind cannot be compiled as readily as literary selections. In large part, therefore, the selections of readers which deal with the special fields must be written, and written from the standpoint of the children who are to read them. This is a difficult task—much more difficult than compilation—and a task which may well enlist the best talent.

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CHAPTER XI

STANDARD TESTS FOR MEASURING READING ABILITY

During the last few years students of the reading process have been directing their attention increasingly toward the development of standard tests for measuring ability in reading. In consequence many tests are available to-day—so many, indeed, that any discussion of the reading process which did not include some account of these would be quite incomplete. From the standpoint of the immediate purposes which these tests serve the following classes may be distinguished: (1) those measuring mastery of words as phonograms; (2) those measuring mastery of word meanings; (3) those measuring comprehension of sentences and paragraphs; (4) those measuring mastery of word meanings and comprehension of sentences and paragraphs; and (5) those measuring rate and comprehension in connection with reading extending over given units of time. We shall discuss the tests in this order.

Tests measuring mastery of words as phonograms.—Tests which measure the mastery of words as phonograms are in the very nature of the case concerned with oral reading. They may measure a pupil's ability to pronounce isolated words or they may test the accuracy of his pronunciation in connection with continuous reading. The following tests have been developed for this purpose:

The Jones Scale for Teaching and Testing Elementary Reading.—This scale is made up of two word lists—one containing 118 phonetic words and the other 192 sight words. The phonetic list contains all vowel bases or phonograms which occur 10 or more times in ten leading primers and the sight list contains all the sight words which occur 10 or more times in the same primers. Jones [1] states that these word lists were originally intended "to indicate the field of the first year's vocabulary," but that they were ultimately found to be of greater service as a test to aid in discovering a "pupil's command of the words common to the first, second, and third readers." The nature of this kind of tests demands in the very nature of the case individual examination. A fair estimate of the attainment of a class may, however, be obtained by examining alternate pupils only. The test materials are conveniently arranged—the words of each list being printed in the order of their frequency on a "Pupils' Card" and a "Teacher's Card." While the pupil reads the words from the former, the teacher checks the results in appropriate spaces on the latter. The chart on the following page gives examples chosen at equal intervals from the two word lists—the phonetic and the sight.

A separate score is found for each list. In finding the score of a pupil—in the case of either list—the examiner determines the difference between the sum of the frequencies of the words of the list and the sum of the frequencies of the words missed by the pupil and divides this by the sum of the frequencies of the words of the list—the quotient being the score. Thus in the case of the

[1] See "Selected References" (5).

PHONETIC WORDS

PUPIL	1	2	3	4	5	6	7	8	9	10
1101 bit										
403 shake										
228 trick										
140 swim										
127 chew										
89 find										
64 would										
45 pull										
36 charm										
25 dance										
18 hole										
12 nod										

SIGHT WORDS

PUPIL	1	2	3	4	5	6	7	8	9	10
1732 the										
224 here										
131 mouse										
87 fly										
65 tree										
43 roll										
32 over										
25 love										
20 wee										
17 iron										
14 wash										
11 meadow										

sight list the sum of the frequencies of the words is 17,565. If the sum of the frequencies of the words missed by a given pupil is 3,513 his score will be 17,565 minus 3,513 divided by 17,565 or 80 per cent. The following are typical average scores obtained through this scale:

GRADE	PHONETIC LIST	SIGHT LIST
A 1	.752	.846
B 2	.941	.966
A 2	.965	.978
B 3	.984	.987
A 3	.986	.990

It will be observed that the score of a pupil depends more upon the frequencies of the words missed—these ranging in the case of the phonetic list from 1101 to 10 and in the case of the sight list from 1732 to 10—than upon their number. The difficulty of the words is left entirely out of consideration. The fact that the words are evaluated in terms of their frequencies rather than on the basis of their difficulty has frequently been criticized. As a matter of fact there is need of more than one

test at this point. One of these may well be based on the assumption—as the Jones Scale is—that within the limits of a suitable vocabulary for primary children those words are most important which occur most frequently in actual reading. However, such a scale measures teaching rather than achievement on the part of the pupil. It is, therefore, of particular value to the supervisor in comparing the work of different teachers and to the individual teacher in evaluating her own aims and methods of procedure. Another test might well be based on the assumption that the words of a primary vocabulary should be evaluated in terms of their difficulty.

The Haggerty Scales for Reading Vocabulary of Primary Children.—In these scales the words of the Jones lists are arranged in scaled groups in the order of their difficulty—nine for the phonetic and twelve for the sight list—the words being considered difficult in proportion to the numbers of times that they were missed by some 700 children. Values are assigned accordingly. To this point the scales contain all the words of the Jones lists. Haggerty [1] recommends, however, that in actual practice only certain words of alternate steps be used. In this way a class of twenty-five pupils may be tested in an hour. The abbreviated scales together with the values of the steps are shown on the following page.

"In scoring, a pupil is credited with the highest numbered line in which he achieves but one error or omission. A class is credited with the line in which there is 20 per cent of error." It is obvious that the value of this kind of tests must depend largely upon the extent to which

[1] See "Selected References" (4).

VALUE OF STEPS	SCALE D′—PHONETIC WORDS
50	bit, cow, that, out, fox
55	stay, ran, gun, like, meat
65	hand, ten, name, head, cold
75	yet, trick, toy, frog, find
85	crown, chew, kite, snag, lace

VALUE OF STEPS	SCALE DD′—SIGHT WORDS
50	come, who, one, she, on
55	your, pretty, yes, too, house
65	here, has, bird, put, shall
75	mamma, blue, next, wood, rabbit
85	lion, monkey, cradle, naughty, visit
95	hurrah, pigeon, circus, picnic, pieces

a standardized vocabulary—the Jones lists in this case—is used in the teaching of primary reading. When such a vocabulary is used, the scales will constitute an excellent means of measuring the achievements of pupils.

Gray's Standard Oral Reading Test.—This test [1] consists of a series of twelve short paragraphs arranged in the order of their difficulty and separated by approximately equal steps. The series was obtained through elaborate experimentation. The test is intended to measure the rate of oral reading and the accuracy of pronunciation. Pupils are tested individually, the examiner recording the time required for the reading of each paragraph, and all errors falling under the following classes:

(1) Gross errors in pronunciation, *i.e.* mispronunciations which indicate clearly that the words are beyond the pupil's ability.

(2) Minor errors in pronunciation, *i.e.* mispronunciation of one or two elements of a word.

(3) Omission of words.

[1] See "Selected References" (3).

(4) Substitution of one word for another.
(5) Insertion of words not included in the text.
(6) Repetitions.

A pupil continues to read until he makes—in the case of each of two paragraphs—at least the following number of errors:

(1) Five or more if the paragraph is read in 40 or more seconds; or,
(2) Seven or more if it is read in less than 40 seconds.

The reading of each paragraph is scored in accordance with four standards of increasing severity. It is checked as a failure if:

A. It is not read because of previous failure.
It is read in 40 or more seconds with 5 or more errors.
It is read in less than 40 seconds with seven or more errors.

B. It is not read because of previous failure.
It is read in 30 or more seconds with four or more errors.
It is read in less than 30 seconds with five or more errors.

C. It is not read because of previous failure.
It is read in 25 or more seconds with three or more errors.
It is read in less than 25 seconds with four or more errors.

D. It is not read because of previous failure.
It is read in 20 or more seconds with two or more errors.
It is read in less than 20 seconds with three or more errors.

In order to receive full credit for the reading of a paragraph, a pupil must read it correctly in accordance with

each of these standards. Beyond this the credit which a pupil receives for the successful reading of paragraph 1 varies from grade to grade—a first grade pupil receiving a maximum and an eighth grade pupil a minimum of credit. The values of the other paragraphs are the same for all the grades.

In computing the average class score the examiner (1) finds the sum of the scores for each paragraph separately, (2) multiplies the score for each paragraph by its value, (3) finds the sum of the products, and (4) divides this by four times the number of pupils in the class.

In computing individual scores he takes steps (1), (2), and (3)—as indicated above—and (4) divides the sum of the products by 4.

The average class score may also be found by computing the average of the individual scores. The following average class scores—obtained in Grand Rapids in 1916—may be regarded as typical:

GRADE	SCORE	GRADE	SCORE
1	35	5	50
2	44	6	47
3	47	7	48
4	49	8	48

Most commonly—in order to show progress from grade to grade—the scores are represented graphically as in Chart IV. The relative positions of the vertical lines representing the successive grades indicate the different levels of expectation for the several grades—more being expected of pupils as they advance from grade to grade.

This test, it should be borne in mind, concerns itself

purely with the mechanics of reading—no attempt being made to measure comprehension. There can be no doubt that it serves the purposes for which it is intended admirably. Not only does it enable the teacher to measure

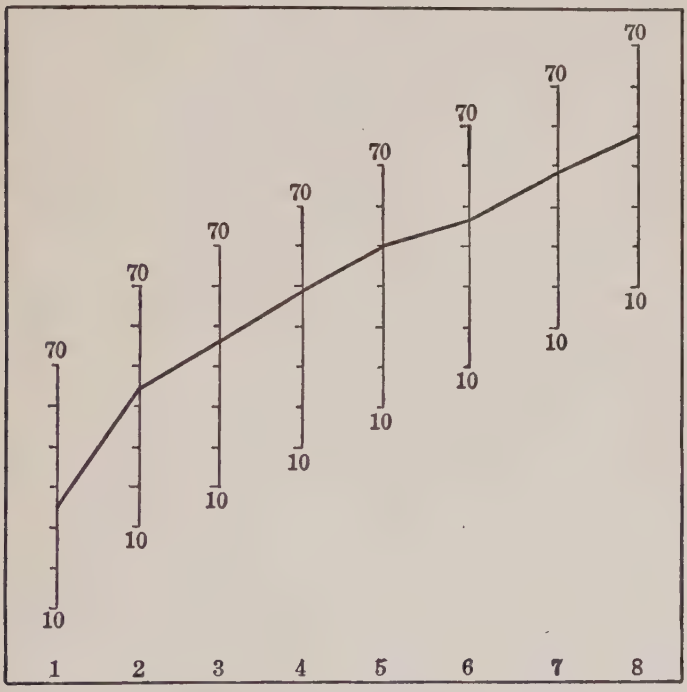

Chart IV. Average Oral Reading Scores—Gray's Standard Oral Reading Test

the achievements of pupils in the mechanics of oral reading with a high degree of accuracy but it makes possible—because of its analytical character—a careful diagnosis of the causes responsible for unsatisfactory progress.

Tests measuring mastery of word meanings.—Achievement in word pronunciation and mastery of meanings do not necessarily go together. Under skillful methods of teaching the mechanics of pronunciation, the former may materially outstrip the latter. In consequence a pupil may translate the symbols of the printed page into speech with speed and accuracy but fail in the interpretation of their meanings. The following tests—intended to determine the extent to which a pupil has acquired a working knowledge of word meanings—are, therefore, of great value in determining the efficiency of reading instruction:

The Thorndike Visual Vocabulary Scales.—Thorndike[1] has developed three visual vocabulary scales—Scale A, Scale A2, and Scale B. The purpose of these scales is to "measure how hard words a pupil can read in the sense of understanding their meanings well enough to classify them under the proper heading as an animal, a flower, something about time, etc." Scales A2 and B are extensions of Scale A and are practically alike. We may, therefore, confine our discussion to Scale A2 which is used most extensively. The main body of this scale consists of twenty-three groups of words—these being divided into an X and a Y series. The ten words of each group are practically equal in difficulty, "in the sense that approximately the same percentage of pupils in a given grade will succeed" with each. The groups are distributed over steps 4 to 10—these also differing by approximately equal amounts. The X series of the scale—including directions to pupils—is shown on the following page.

[1] See "Selected References" (12).

Write the letter F under every word that means a *flower.*
Write the letter A under every word that means an *animal.*
Write the letter N under every word that means a *boy's name.*
Write the letter G under every word that means a *game.*
Write the letter B under every word that means a *book.*
Write the letter T under every word like *now* or *then* that means something to do with *time.*
Write the word GOOD under every word that means something *good to be* or *do.*
Write the word BAD under every word that means something *bad to be* or *do.*

4x. daisy, camel, samuel, rabbit, monkey, william, tulip, goat, paul, violet
4½x. lazy, bible, squirrel, buffalo, peter, beaver, lewis, hare, sneak, clover
5x. cowardly, dominoes, kangaroo, tennis, wicked, early, dictionary, polite, leopard, lotto
5½x. morning, selfish, zebra, before, fair, while, evening, rascal, whenever, lilac
6x. mean, stag, worthy, meantime, last, year, wednesday, giraffe, guilty, stupid
6½x. tuesday, pool, first, heroic, carnation, ape, april, villain, never, raccoon
7x. constantly, sincere, chess, weak, antelope, eugene, henceforth, julian, formerly, candytuft
7½x. luke, archibald, genuine, jonas, recent, chrysanthemum, considerate, deceitful, lynx, panther
8x. abel, marigold, puma, valiant, frequent, godfrey, rarely, otter, elmer, forthwith
8½x. eric, accurate, conceited, encyclopedia, eli, chamois, cowslip, defaulter, preceding, hitherto
9x. hyæna, luther, cultured, duncan, ethan, primer, insolent, sane, corrupt, repeatedly
9½x. brian, porcupine, nasturtium, gazelle, peony, sullen, parchesi, ezra, craven, jackstraws
10x. phlox, seth, dependable, judicious, caribou, orchid, ruthless, compassionate, cyrus, petunia

The scales are accompanied by carefully worked out directions regarding the most advantageous methods of procedure in giving the tests to individuals and to classes. Certain short cuts are recommended in cases "where only a measure of the general drift of achievement is desired." Thorndike also points out that "if it is desired to retest a group for improvement later, the X or Y words alone may be used in the first measurement, or the integral steps may be used in the first and second measurements, and the half steps in the third." Furthermore, a test may be carried on with only a part of the words of each group—the balance being reserved for later use. The scoring is relatively simple and objective—a pupil's score being the number of the step in which he succeeds with not less than 80 per cent of the words.

The Haggerty Visual Vocabulary Scales.—Haggerty[1]—using the method employed by Thorndike—determined the relative difficulties of approximately 1000 words embracing twenty-seven different classes. He then arranged 774 of these in sixteen groups—each "representing a distinct degree of difficulty." The lowest was assigned a value of 5, the next 10, and so on up to 80. This scaled list of words,—intended largely to extend the Thorndike Scale A "and to provide duplicate scales for further testing"—was designated the Indiana-Thorndike Vocabulary Scale. Haggerty thereupon selected certain words from each group of the scale and constructed his visual vocabulary scales—Scale R and Scale R2. The two are of approximately equal difficulty and may, therefore, be used interchangeably, or, when it is desired to measure

[1] See "Selected References" (4).

improvement, one may be used at the beginning of a practice period and the other at the close. When desired, further scales may be formed from the original list. These tests are administered and scored much like those of Thorndike.

The Starch English Vocabulary Test.—This test differs from the preceding in that it does not depend upon definitely standardized and evaluated word lists. It consists of two lists of 100 words each—these having been chosen at regular intervals from Webster's "New International Dictionary." This method of selecting words, Starch [1] holds, "yields a fair and representative sampling of the entire English vocabulary." The test is, therefore, especially adapted to determine the range of the word meanings which an individual has mastered. The directions given the pupils are as follows:

> Make a check mark (✓) after each word whose meaning you are sure of and which you could use correctly. Write the meaning after such other words as you are familiar with but of whose meanings you are not quite sure.
>
> Then you will be asked by the examiner to write the meaning after any of the difficult words that you may have checked so as to make sure that you did not check any that you did not know. If you cannot give a meaning, cross the check mark off. Words which are similar to common words but which have entirely different meanings will especially be called for, such as, belleric, canon, to cree, Mut, peavy, etc.

A pupil's score is the percentage of words the meanings of which he indicates correctly. Tentative standards—thus far announced by Starch—are as follows:

[1] See "Selected References" (11).

SCHOOL	GRADE OR YEAR	SCORE
Elementary	4	30
"	5	33
"	6	36
"	7	39
"	8	42
High School	1	45
"	2	47.5
"	3	50
"	4	53
University	1	56
"	2	58.5
"	3	61
"	4	63

Tests measuring comprehension of sentences and paragraphs.—Although the two processes are intimately related it is obviously one thing to recognize word meanings and quite another to understand sentences and paragraphs. The latter is a more difficult and a more complex process. As Haggerty points out, "the grammatical relation of the words and the range of personal experience are determining factors lying outside the limits of mere word knowledge. The sentence: 'He found law dear and left it cheap,' does not contain a word that is not more or less familiar to the twelve-year old child, yet few twelve-year olds will have any adequate understanding of the passage." Tests measuring comprehension of connected discourse—sentences and paragraphs—are, therefore, of vital importance. These tests measure comprehension directly by testing the reader's ability to respond to what is being read—usually by way of answering questions or following directions. The rate of reading usually is measured indirectly on the basis of the responses which

the reader makes during a given unit of time. The following tests and scales fall under this head:

The Thorndike Scales for Measuring the Understanding of Sentences and Paragraphs.—Two of these scales have been developed—Scale Alpha and Scale Alpha 2.[1] The latter is an improved and extended form of the former. We shall, therefore, limit our discussion to this. The scale consists of seven sets of sentences or paragraphs —each set being accompanied by a series of questions. The sets are arranged in the order of increasing difficulty —the value of each set having been determined experimentally as in the case of previous scales. The following extract from *Set V—Difficulty 8* will serve to illustrate the nature of the passages and the questions:

Read this and then write the answers to 5, 6, 7 and 8. Read it again if you need to.

In Franklin, attendance upon school is required of every child between the ages of seven and fourteen on every day when school is in session unless the child is so ill as to be unable to go to school, or some person in his house is ill with a contagious disease, or the roads are impassable.

5. What is the general topic of the paragraph?.....
.....

6. How many cases are stated which make absence excusable?
.....

7. What kind of illness may permit a boy to stay away from school, even though he is not sick himself?.....
.....

8. What condition in a pupil would justify his non-attendance?
.....

[1] See "Selected References" (12).

The scoring—as in the case of Scale A2—is relatively simple and objective. The score is based entirely upon the quality of the answers to the questions, the time element being ignored. In evaluating the answers the examiner is guided by a carefully prepared key which contains summaries of possible right responses. A pupil's score is the value of the most difficult set of which he is able to answer at least 80 per cent of the questions. Similarly the score of a class is determined by the value of the most difficult set which it can read with approximately 80 per cent of correct answers. Here again the examiner is supplied with a table which greatly facilitates scoring. Thorndike's standards of achievement—those for the high school grades being provisional estimates only—are as follows:

SCHOOL	GRADE	SCORE
Elementary	4	5.25
"	5	5.75
"	6	6.50
"	7	7.00
"	8	7.50
High School	1	7.75
"	2	8.00
"	3	8.25
"	4	8.50

The Thorndike-McCall Reading Scale for the Understanding of Sentences.—More recently McCall and Thorndike have developed a new scale known as the Thorndike-McCall Reading Scale for the Understanding of Sentences.[1] This consists of ten complete forms or tests—one for each month of the school year—Scale

[1] See "Selected References" (12, 8).

Alpha 2 having been adapted and incorporated as one of these forms. Each form or test consists of some twelve selections and about thirty-six questions. These are arranged in the approximate order of their difficulty, the relative difficulties having been determined experimentally. Thirty minutes are allowed for each test—pupils being permitted to read the selections as often as necessary in order to answer the questions. The following selections—upon which questions 1-4 and 31-33 of Form 6 are based—will serve to illustrate the nature of the test materials:

Read this and then write the answers. Read it again if you need to.

Fred lives in the country. He likes to hunt and fish, and has a gun that cost sixteen dollars. His sister Grace keeps hens and ducks, and sells the eggs. She is learning to play the piano, and goes to Miss Thomas for a lesson every Saturday. She likes music but Fred doesn't.

1. Write the name of Grace's brother.....

2. Write the name of the music teacher.....

3. What does Grace keep?.....

4. Write words telling the cost of the gun.....
.....

Read this and then write the answers. Read it again if you need to.

However certain it may seem to be that men work only because they must, and would avoid labor except for the food, clothing and luxuries that are its rewards, the facts may well be to the contrary. It can hardly be the case that men dislike

work because they wish to be utterly idle. For mere rest, mere inactivity, is not commonly enjoyed. To have nothing to do is not what men seek. Were that so, we should envy the prisoner shut up in his cell. If men had to choose between a life spent at eight hours of work daily in a factory and a life spent at eight hours of sitting on a throne without moving hand or foot, many of them would, after trying both, choose the former. Activity of body or mind, at which a man can succeed, is, in and of itself, rather enjoyed than disliked.

31. What is it that this paragraph says may seem sure, but probably is false?.....
.....
32. What, according to the paragraph, has no appeal *per se?*
.....
33. What is it the author of the paragraph suspects men might choose unless they had tried it?.....
.....

While the scale is elaborate from the standpoint of construction, the scoring is very simple. Each test is accompanied by specific directions for scoring—including a "scoring key" containing samples of correct and incorrect answers. After determining the number of questions a pupil has answered correctly, the examiner translates this—on the basis of a table—into a "T Score"—this being the pupil's score. The class or grade score is found by determining the average of the pupils' scores. Upon finding the class or grade score the examiner compares this—on the basis of a table of grade norms—with the norm for the grade in question.

Each pupil is thereupon compared with an age norm. The examiner notes—on the basis of a table which shows in terms of months the ages which normally go with the several possible T Scores—the reading age which corre-

sponds to the T Score of the pupil in question. This he divides by the pupil's chronological age—again expressed in months. The quotient—multiplied by 100 to avoid decimals—is the pupil's "reading quotient." For the child with normal reading ability the reading quotient is 100; for the one with inferior reading ability it is below 100; and for the one with superior reading ability above 100.

In discussing the fact that the scale provides for two scores—one for the grade and the other for the age of the pupil—the authors point out that:

> There are at least two useful ways of expressing the reading ability of a pupil (or of a class). How well a pupil reads is shown first by a comparison of his reading score with the norm for his grade. The use of this method alone encourages the school to retard pupils chronologically either unconsciously or consciously in order to give an appearance of high efficiency. Given a sufficient percentage of over-ageness or under-ageness, almost any school can appear efficient or inefficient respectively when compared with grade standards.
>
> How well a pupil reads is shown, second, by a comparison of his reading score with the norm for his age. This is just what is expressed by the reading quotient. Showing as it does what the school has accomplished for the pupil by a given age rather than a given grade, the reading quotient has very great value, because the school cannot raise the reading quotient above 100 nor depress it below 100 by creating undue chronological retardation or acceleration respectively.

Finally, the point of reference and the unit of measurement are unique in this scale. The former—the reference or starting point in scoring—is the average performance of twelve-year-olds—children from twelve to thirteen years of age. The latter—the unit of measurement—is the *S. D.-multiplied-by-ten* of twelve-year-old children—

called T after Thorndike and Terman. Accordingly a pupil who makes a scale score of 50 has an ability of twelve-year-olds; one who makes a scale score of 40 has an ability which is 10 units or 1 S. D. below the average ability of twelve-year-olds; and one who makes a scale score of 60 has an ability which is 10 units or 1 S. D. above the average ability of twelve-year-olds. While the reference point is the average performance of twelve-year-olds, the mathematical zero has—for purposes of convenience—been located 5 S. D. below the average.

The Haggerty Reading Examination—Sigma 1.—This examination [1]—intended for grades 1 to 3 inclusive—consists of two tests. The first contains twenty-five items or parts, each calling for a definite response. The responses make no demands upon the reader's ability to express himself in terms of language. All he is required to do is to make certain marks. Thus Item 5 consists of the picture of a rabbit accompanied by the direction: "Find the rabbit's tail and make it longer," and Item 25 contains a brief description of the interior of a submarine accompanied by the direction: "Draw a line under the one of these three words"—*little, much, none*—"that best shows the amount of machinery to be seen." The test extends over a period of twenty minutes. The second test consists of a series of twenty questions each to be answered by underscoring the word *yes* or the word *no*. The test extends over a period of two minutes.

The scoring is simple—each test being accompanied by a scoring key and detailed directions. In the case of the first test each item counts one point and in the case of the

[1] See "Selected References" (4).

second the score is "rights minus wrongs." The following grade standards and age norms are available at present:

GRADE STANDARDS

GRADE	SCORE: TEST 1	TEST 2
1	4	2
2	12	8
3	16	14
4	20	18

AGE NORMS

GRADE	SCORE: TEST 1	TEST 2
7	6	4
8	12	7
9	15	12
10	18	15
11	24	19

The Kansas Silent Reading Tests.—This series [1] consists of three tests—one for grades three, four, and five; another for grades six, seven, and eight; and a third for high school pupils. Each test consists of sixteen exercises evaluated experimentally and arranged in the order of increasing difficulty. The following exercises from Test I will serve to illustrate the nature of the tests:

No. 1

Value 1.2	I have red, green and yellow papers in my hand. If I place the red and green papers on the chair, which color do I still have in my hand?

No. 15

Value 4.8	Fred has eight marbles. Mary said to him: "If you will give me four of your marbles, I will have three times as many as you will then have." How many marbles do they both have together?

[1] See "Selected References" (7).

These tests are easily administered. The scoring of the results is simple and objective—a pupil's score being the sum of the values of the exercises which he succeeds in answering correctly in five minutes. "Every answer given is counted either wholly right or wholly wrong." The following median scores are based upon the measurement of more than 100,000 children in all parts of the country:

GRADE	MEDIAN SCORE	GRADE	MEDIAN SCORE
3	5.3	8	19.2
4	9.5	9	22.9
5	13.2	10	25.6
6	13.9	11	26.5
7	16.2	12	29.7

The exercises of the Kansas Silent Reading Tests have been severely criticized. It has been pointed out that they are puzzles rather than typical reading selections and that they represent tasks the solution of which calls for special knowledge and for abilities quite different from those entering into the normal process of interpreting the printed page. These criticisms are probably —in part at least—well taken, and the author has been quite generous in admitting them. He points out, however, that it seemed practically impossible at the time the scale was developed to obviate the defects in question except at the expense of his main objective—a scale which would measure comprehension in a thoroughly objective manner.

Monroe's Standardized Silent Reading Tests.—Monroe [1] has more recently developed a reading scale which

[1] See "Selected References" (9).

represents an attempt to eliminate some of the defects of the Kansas Silent Reading Tests. In choosing the exercises for the scale the author proceeded on the assumption "that ability to understand sentences and paragraphs depends in part upon one's store of information." He, therefore, confined himself as much as possible to the field of general reading, avoiding "particular fields such as Arithmetic and Geography." The following exercises from Test I will serve to illustrate the nature of the selections:

No. 1

Rate Value 8	"I am not playing, little girl," said the squirrel. "I am running to my home in the hollow tree. Don't you hear my babies calling me? I must feed them." Where was the home of the squirrel? In the ———	Comprehension Value 1

No. 16

Rate Value 14 (141)	By the sound of the birch he urged some tardy loiterer along the flowery path of knowledge. Truth to say he was a very conscientious man and ever bore in mind the maxim: "Spare the rod and spoil the child." Ichabod Crane was a school-teacher. If you think he spoiled his scholars, draw a line under rod; if he did not, draw a line under child. rod scholars child teacher	Comprehension Value 4

The exercises were evaluated in the same manner as those of the Kansas Silent Reading Tests—the results being, however, based upon more than three times as many cases. The methods of scoring, too, are practically

identical aside from the fact that Monroe makes provision for a special rate score—this being obtained by dividing the total number of words in the exercises read by five. This score represents the number of words read per minute but, as Monroe points out, it is not comparable with the usual rate scores since the selections vary in difficulty, and since the time consumed in answering the questions is included. The following standard median scores have thus far been submitted:

GRADE	MEDIAN SCORE: RATE	COMPREHENSION
3	57	8.7
4	83	15
5	91	20
6	96	21
7	98	25
	108	28
9	87	22
10	81	25
11	88	26.4
12	89	27

Tests measuring mastery of word meanings and comprehension of sentences and paragraphs.—Tests which fall under this class combine in one series of tests the three functions—measuring mastery of word meanings, comprehension of sentences, and comprehension of paragraphs—covered by the last two classes of tests. The results are expressed in terms of one score.

The Haggerty Reading Examination—Sigma 3.—This examination [1]—intended for grades 6 to 12 inclusive—consists of three tests: one for vocabulary, one for sentences, and one for paragraphs. The first contains a

[1] See "Selected References" (4).

series of fifty words each followed by four meanings—one true and the others false—the reader being required to underscore the true one. Five minutes are allowed for the test. The second test consists of a series of forty questions each followed by the words *yes* and *no*. The reader answers these by underscoring the appropriate word. Three minutes are allowed for this test. The last test consists of a series of seven paragraphs each followed by several series of statements and terms—each series consisting of three or four members—one true and the others false. The reader is required to check the true statements and to underscore the true terms. Twenty minutes are allowed for this test.

This examination—like Sigma 1—is easily scored. It is accompanied by a carefully prepared scoring key and explicit directions for scoring. The score for the first test is the "number right"; for the second it is "rights minus wrongs"; and for the third, "twice the number right." The final score is the sum of the three. The following grade standards have been submitted:

GRADE	SCORE
5	31
6	50
7	68
8	76
9	84
10	90
11	96
12	102

Tests measuring rate and comprehension of reading extending over a given unit of time.—Tests falling under this class measure rate and comprehension of reading

separately, the result for each being expressed in a distinct score. Rate scores are usually expressed in terms of the average number of words read per second or per minute. Comprehension scores are expressed more variously since methods of measuring comprehension differ materially. Most commonly, however, these scores are expressed in terms of percentages—the percentage of questions answered correctly, the percentage of points adequately reproduced, the percentage of words used correctly in the reproduction as compared with the original number, or a percentage involving a combination of these factors. Occasionally the rate and comprehension scores are combined to form a single index of reading efficiency.

The Starch Silent Reading Test.—This test[1] consists of nine selections—one for each of the eight elementary grades and one for high school pupils. These selections were chosen from representative readers and are supposed to increase in difficulty by approximately equal steps. In taking the test pupils are allowed to read for thirty seconds. Experimental evidence led Starch to believe that a short interval such as this would afford fully as reliable indices of reading ability as longer ones. The test extends over two days—the regular grade selection being read the first day and the one immediately below this on the second. The rate score is expressed in terms of the average number of words read per second in the two tests. Immediately upon the reading the pupils are asked to reproduce in writing as much as possible of the materials read. The comprehension score is represented by the

[1] See "Selected References" (11).

average number of words—words which express essential ideas, all others having been eliminated by the examiner —used in the two reproductions. Starch feels that this method of reproduction is more objective and fully as reliable as any other. The following standard scores for rate and comprehension have been submitted:

GRADE	RATE (WORDS PER SECOND)	COMPREHENSION (WORDS WRITTEN)
1	1.5	15
2	1.8	20
3	2.1	24
4	2.4	28
5	2.8	33
6	3.2	38
7	3.6	45
8	4.0	50

Brown's Silent Reading Test.—This test [1] is intended for elementary pupils above the second grade and for high school students. The same selection is used throughout. The reading continues for one minute and the pupil's score is the average number of words read per second. Immediately upon the reading pupils are "required to reproduce in writing as much as they can remember of what they have read." The reproductions are scored for both quantity and quality. This task is greatly facilitated by a key which contains an enumeration of the essential ideas which should be reproduced. The following paragraphs, together with the corresponding portion of the key, will serve to illustrate the nature of the test:

[1] See "Selected References" (1).

THE LONG SLIDE

The boys and girls who live in a certain part of a small town in the country several miles from any village attend school in a little red schoolhouse known as the Long Hill school.

It has this name because it is situated on the top of a very long, steep hill. Ever since anyone can remember, the scholars of the Long Hill school have always had time to slide down the hill just once at recess in winter and get back to the schoolhouse before the bell rings to call them back again into school. They can go down very rapidly, but it takes a long time to walk back.

Last Monday morning Frank Lane appeared at school with a fine, new sled. It was a double-runner which his uncle, who owns a carriage factory in the city, had given him. He named his new sled the Simoon and almost had a fight with Tom Smith, who said it was foolish to put such a name on a sled, but he kept on calling it the Simoon.

THE KEY

1. *Some children* in the country *attend school.*
2. *The schoolhouse is* known as *the Long Hill School.*
3. *It is situated on* top of *a* long *hill.*
4. *The pupils slide* down hill *once at recess* in winter.
5. One day *a boy brought* to school *a new sled.*
6. His uncle had *given* it *to him.*
7. *He named it* the *Simoon.*
8. *He almost had* a *fight* with another boy.
9. This *boy said* the *name was foolish.*

In scoring the examiner first determines the number of points reproduced and expresses this "as a percentage of the total number in the portion of the selection read" —this being designated as "quantity of reproduction." He thereupon reëxamines these points retaining this time only those ideas "which are entirely correct in every respect and of which every detail is reproduced." The number of points meeting these requirements is again ex-

pressed "as a percentage of the total number in the portion of the selection" read—this being called "quality of reproduction." The final comprehension score is represented by the average of the quality and quantity scores. Brown considers this method of scoring comprehension especially valuable because of the possibilities which it affords in "diagnosing individual deficiencies." Provision is made, finally, for an efficiency score—the product of the rate and comprehension scores. The following tentative standards based upon the attainment of "the best class yet found in any grade" have been submitted:

GRADE	RATE SCORE	COMPREHENSION SCORE	EFFICIENCY SCORE
3	3.32	46	127.82
4	3.55	65	217.13
5	4.49	61	290.96
6	4.54	68	294.95
7	4.65	87	322.33
8	4.84	79	323.57

The Courtis Standard Research Test in Silent Reading—Test Number 2.—This test[1] is intended for grades 2 to 6 inclusive. One selection—a chapter from a story in a children's magazine—is used throughout. The test is designed to measure the simplest phases of silent reading—the rate and "the comprehension of the essential elements of a passage in their essential relationship." The test is divided into two parts. In the first part the pupils are given three minutes during which they are to read as much of the selection as possible, the directions being as follows:

[1] See "Selected References" (2).

Read silently, and only as fast as you can get the meaning; for when you have finished, you will be asked to answer questions about what you have read. You will be marked for both how much you read and how well you understand it, but it will be better to get the meaning of the story than to read too fast.

At the end of every thirty seconds, at a signal given by the examiner the pupils indicate automatically with a pencil mark the point at which they have arrived. This makes possible a comparison of the rates of reading at different intervals of the test period, a factor which Courtis considers of marked importance in analyzing reading rate. The rate score thus obtained is expressed in terms of the number of words read per minute.

The second part of the test is intended to test comprehension. The test selection is now divided into paragraphs, each being followed by five simple questions—questions which are to be answered by *yes* or *no*. The following paragraphs together with the questions will serve to illustrate the nature of this part of the test:

Up at the house everyone was busy too. This year the whole Bennett family was going to spend the Fourth of July in the woods. They planned on taking along many baskets of good things to eat.

1. Was the picnic to be held in the woods? _____
2. Were they going on the third of July? _____
3. Was the whole family going to the picnic? _____
4. Were they to take along good things to eat? _____
5. Was everyone out at the barn with John? _____

The little Bennetts were to wade in the brook and help roast corn and potatoes in a bonfire. They thought this would be great fun, for they could not do these things in the big city where they lived.

6. Did the Bennetts live in the country? _____
7. Was there to be a bonfire at the picnic? _____
8. Were the children to help roast corn? _____
9. Were they told not to wade in the brook? _____
10. Could they do these things in the city? _____

Five minutes are allowed for these exercises—the pupil indicating at the end of each minute the point at which he has arrived. The following directions are given:

> Answer as many questions as you can in the time allowed, but it is better to have the answers right than to try a great many questions. Do not guess at the answers. If you do not remember what the story said, read the paragraph just above the question again and again until you find the right answer. There are four pages of questions. As soon as you finish one, begin another.

In order that the pupils may understand exactly what is expected of them, these exercises are preceded by drill on a preliminary paragraph. The exercises are supposed to measure both the "facility" and the "accuracy" of comprehension—the former being indicated "by the total number of questions" answered and the latter by the "per cent" which "the difference between the right and the wrong answers is of the right answers."

The tests are available in two sections—one making about the same demands upon the pupil as the other. The sections may, therefore, be used alternately one at the beginning and the other at the close of a semester or year.

Gray's Standard Silent Reading Tests.—The subject matter of these tests [1] consists of three selections—one for grades 2 and 3; another for grades 4, 5, and 6; and the third for grades 7 and 8. The passages were selected

[1] See "Selected References" (3).

experimentally and with special reference to the interests and reading capacities of the several groups. As in the case of the oral reading tests, each pupil is examined individually. In measuring the rate of reading the examiner records the time required for the reading of one hundred words. Each selection is, therefore, printed in three sections—the middle one containing exactly one hundred words. These sections are separated in such a manner that the examiner can easily determine the moment when the reader moves his eyes from one section to the next. The rate score is expressed in terms of the number of words read per second. The following rate scores represent the achievements of 2654 pupils:

GRADE	SELECTION	SCORE
2	I	1.50
3	I	2.30
4	II	2.20
5	II	2.57
6	II	2.79
7	III	2.69
8	III	2.87

Progress from grade to grade is shown best when the scores are represented graphically as in Chart V. For the second and third grades the curve is to be interpreted in terms of the figures at the left of the diagram; for the fourth, fifth and sixth grades, in terms of those on the dotted line on the left between grades three and four; and for the seventh and eighth grades, in terms of those on the dotted line on the right between grades seven and eight. This readjustment in values is necessary since the three selections are adapted to the maturity of the respective groups.

Comprehension is measured in two ways. First, immediately upon the reading the pupil is asked to reproduce—orally in the case of the second and third grades, and in writing in the case of the remaining grades—as much as he can of what has been read. In scoring this

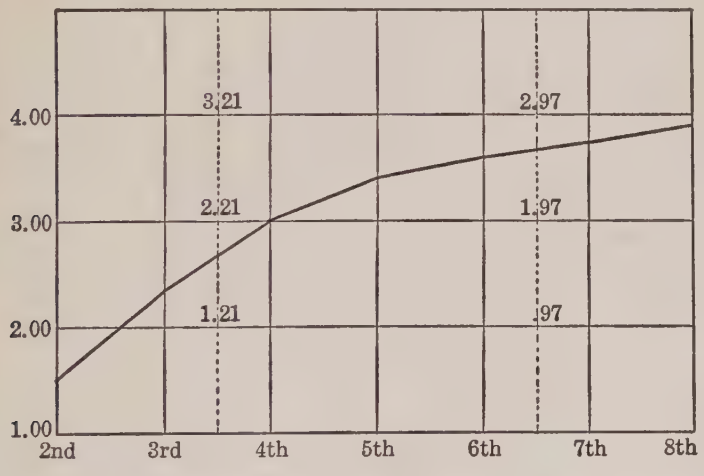

CHART V. PROGRESS OF 2654 PUPILS IN RATE OF SILENT READING

part of the test the examiner checks from the pupil's reproduction all wrong statements, all irrelevant statements, and all repetitions, and computes the percentage which the remaining words are of the total number of words in the selection. In the second part of the test the pupil is required to answer ten questions. A credit of ten points is given for each question correctly answered. The final index of comprehension is the average of these two scores. The following scores represent the achievements of the 2654 pupils mentioned above:

GRADE	SELECTION	COMPREHENSION SCORE
2	I	32
3	I	37
4	II	29
5	II	32
6	II	39
7	III	22
8	III	27

In order to indicate progress from grade to grade the scores are again represented graphically as in Chart VI—the curve being interpreted in the same manner as that for rate.

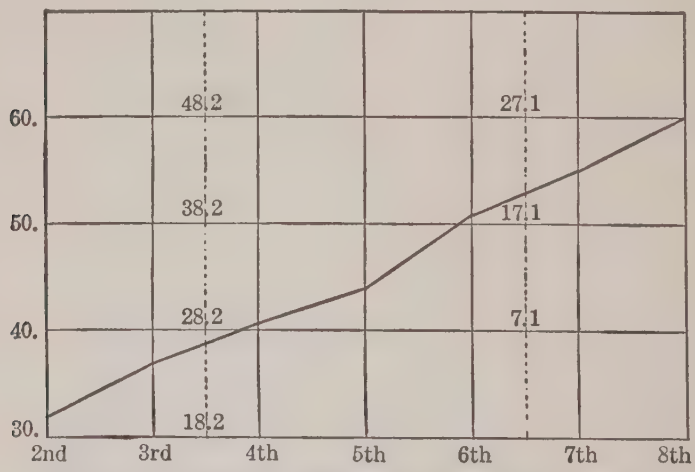

CHART VI. PROGRESS OF 2654 PUPILS IN QUALITY OF SILENT READING

Present status of test movement.—The long and varied list of reading tests which we have reviewed bears striking testimony to the activity and the ingenuity of inves-

tigators. The whole testing movement is of course still in its infancy. Ten years ago there were no reading tests. The tests and scales which are available to-day constitute, therefore, in all probability a mere beginning. But their use represents a marked advance over the empirical procedure which it is rapidly supplanting. Indeed, so serviceable are these tests that they have become quite indispensable to teachers and supervisors in dealing with the various reading situations confronting them, such as determining differences in reading capacity, measuring the progress of pupils from grade to grade, comparing the achievements of individuals and groups of individuals, and evaluating methods of procedure and principles of practice.

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